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This Week in The IRON AGE

Vol. 156, No. 8 August 23, 1945

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Features

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News and Markets

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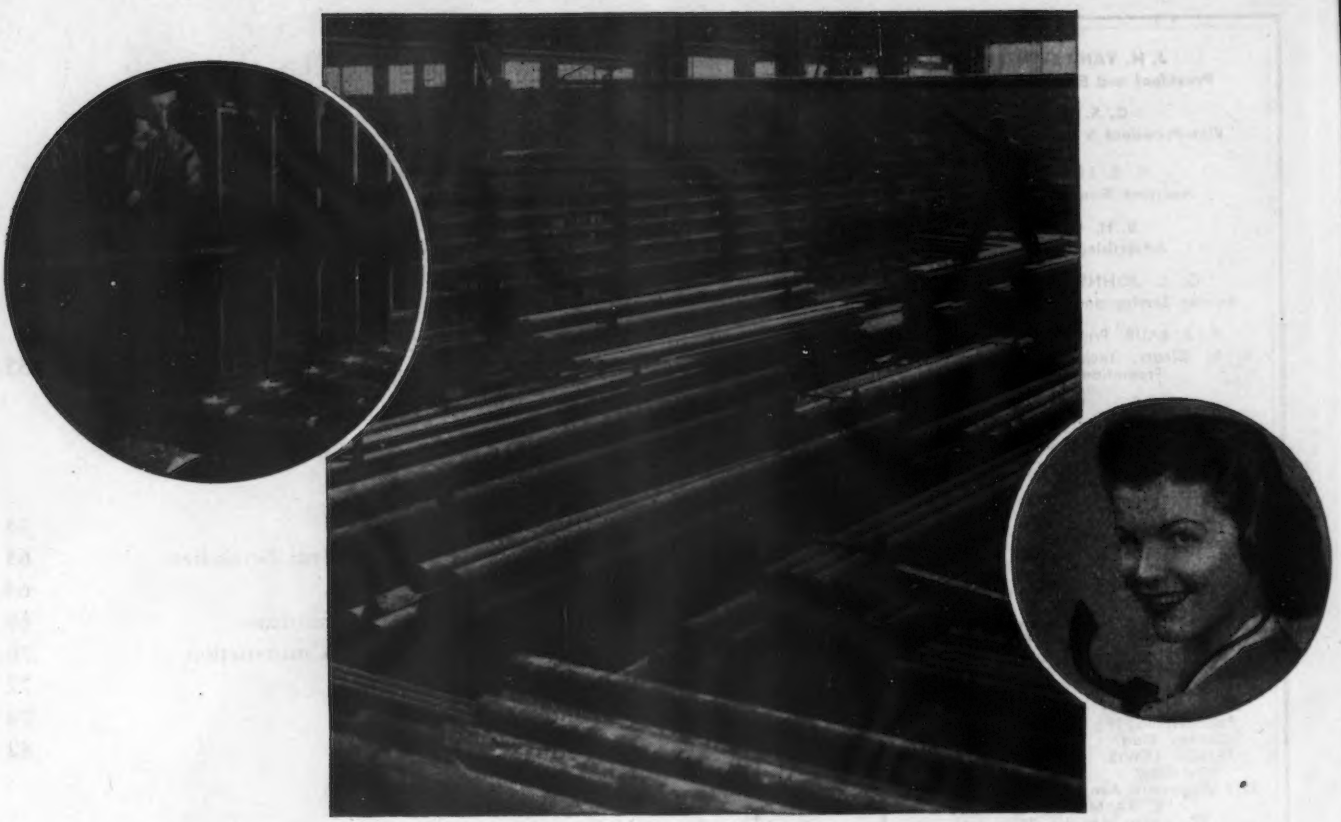

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What Does It Cost?— That's the Answer

POWER. That's a strong word. It can be applied to armies, navies and air forces in war, but in peace it means petroleum, waterfalls and coal.

At the present moment, the whole world is aroused at the thought of atomic power. One teaspoonful of water or any other substance liberally provided by nature, theoretically gives us enough heat to keep us warm over a cold winter or enough power to drive our automobiles around the world.

So day after tomorrow, we are going to step into a new world in which all of the hard and arduous tasks will be performed by disjointed atoms and us humans will just sit around and take life easy.

Pleasant prospect, is it not? But if you believe that, you will believe anything. Especially if it's in print.

I do not often venture into predictions, but I will make this one. None of you who are over fifty years of age will live to see atomic energy make serious inroads into the generation of power by presently known means.

The situation reminds me of the Arabian Nights story of the bottled genie. You fished a bottle out of the sea, found it was full of smoke instead of prewar Scotch and pulled the cork. And out came a gigantic genie who gave you three wishes.

Naturally, you wished for a splendid palace with oil heat and running hot and cold water and a beautiful princess or a harem, depending upon your marital state and religious convictions. Next for a good black market tenderloin steak and finally for ten million dollars or the equivalent in Arabic.

But having exhausted your three wishes, back came the genie in a cloud of fire and pillar of smoke and what he did to you, your palace and your bank account was nobody's business.

So it is with this new discovery of the release of atomic energy. Release of power is much easier than the control of it. Fortunately for us there have been no fatalities so far connected with its development, which is a tribute to our scientists and engineers who took part in its development. But the precautions taken must have been staggering to the imagination. The disassociation of atoms by the method now employed, for example, involve, on a much more elaborate scale, those required for protection against the cancer implanting power of the X ray.

Then, in addition, there is the small matter of cost. So far, we know of two atomic bombs, produced at a cost of two billion dollars. Smashing of the atom is not new; it has been done before repeatedly, but always the energy gained thereby has been infinitesimal in comparison to the energy, effort and time devoted to accomplish the result.

I do not mean to say that we are not on the threshold of a new era in power production. That may well be. But who can measure the distance from threshold to living room in such a situation? So far as revolution in power development is concerned, I would personally put my money on the gas turbine ahead of the atom smasher.

J. H. Van Deventer

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Inland research and product development have more than kept pace with demands for better flat rolled steel products. They have consistently anticipated manufacturers' needs —giving them an infinite variety of steels that fully meet the requirements of modern design and manufacturing methods.

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The IRON AGE
August 21, 1945

NEWS FRONT

Delays in notification of cancellations to subcontractors are already the subject of criticism in Detroit. Tool and die shops, key to auto production, are among those whose notification is being delayed.

The great number of RFC warehouses for storage of surplus material and equipment will have to be constructed faster and in larger number to handle the flood of material being moved from plants.

The whole surplus storage and disposal problem is in pretty discouraging shape despite optimistic bromides from officials in charge. First there is no tally of any accuracy of what is being stored, many of the crates are mis-marked, and all kinds of difficulties stand in the way of scrapping material in view of the possibility of someone someday finding use for a particular item.

Everyone has thought of using bomber fuselages for lunch wagons. The trouble is that no one buys any of the thousands of fuselages. As for many other items, storage charges already more than equal likely end-scrap return, and many items are being moved from warehouse to warehouse on the theory that if kicked around enough it may eventually disappear.

Some warehouses are now so crammed that it is doubtful whether accurate inventory of the contents ever will be possible.

An immediate cancellation of 500,000 tons of plate at Geneva planned for the Navy hit that plant a heavy blow. Now operating are two furnaces, three open hearths, and about half of the coke ovens.

The original plan for the Utah mill called for continued standby operation of the plant for at least eight months after the end of the war.

Engineering plans for the $25,000,000 expansion at Columbia Steel Co., Pittsburg, Calif., are now complete. Conflicting reports are heard as to the status of requests for bids.

The U. S. Steel Corp. eastern plant will probably be built in New Jersey, and will include blast furnaces, open hearths, tin plate, bar, shape and sheet capacity.

Gar Wood Industries, Inc., now plans to build a plant in the San Francisco Bay region, to be complete within six months for the production of a sizable line of heavy contractors' equipment.

Los Angeles estimates of layoffs in the near future run as high as 200,000. Shipyards and aircraft plants are already beginning the mass exodus of workers.

A roller attachment for shears, developed by the Westinghouse Appliance Division, decreases production costs and eliminates scratches during the cutting of large aluminum sheets.

The roller is attached to the top blade so that it is positioned 1/16 in. above the bottom blade when former is in the up position. This allows the aluminum sheet to be rolled over the bottom blade without scratching it.

The ferreting out of German technical information has involved many hundreds of American engineers and millions of dollars. Their reports are all coming through Army official channels marked secret. Since the Army has practically no intelligent mechanism to release information some bored sergeant automatically marks "secret", the reports are piling up in Washington and are of no use to anyone, either big companies or small.

About ten years from now, when no one cares, the Army will likely release the reports for want of something else to do. Naturally there will be considerable fanfare by the Corps of Press Agents at that time.

The use of permeable refractories in furnace construction allows for more rapid attainment of temperature resulting in less fuel being required for initial heating, British experiments reveal.

In addition, fuel consumption is reduced after equilibrium conditions have been reached; temperature is more evenly distributed due to the avoidance of streams leading to flue ports and the elimination of dead spaces at corners, and high temperatures are attained with greater ease.

. . . Industry Estimates

THE purpose of this latest CED study has been to foreshadow, so far as possible, the size of the market for manufactured goods in the first full postwar year after reconversion. To this end more than 1500 manufacturers and manufacturers' trade associations have made forecasts of postwar markets in their various industries. CED has combined all these forecasts into one forecast for all manufacturing industry, and has on the basis of this forecast and other data, developed indications for the same early postwar year, of:

(1) The probable level of manufacturing employment.

(2) The level of employment in the economy as a whole which might go along with such a level of activity in manufactures.

The job of bringing this picture together was one for technicians in the field of business forecasting. David C. Prince, vice-president of the General Electric Co., and vice-chairman of CED's Field Development Div., brought together more than 50 of the country's leading market research experts and business economists, and the task was entrusted to them.

The Marketing Committee's job was not to do the forecasting but to get American business to do it, and to put together and interpret the result. The market appraisal is thus a composite view of postwar markets for manufactured goods by American manufacturers themselves. The opinions as to the significance of this view, so far as the level of postwar employment is concerned, are those of the Marketing Committee.

This study certainly suggests very strongly that, if the aggregate judgment of the manufacturing interests who cooperated with CED is correct, 1947 may well be a year of high-level production, sales and employment.

On this basis, how optimistic should American business be as it plans for 1947?

Should it assume that the indicated level will materialize?

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He should continue to make up his own mind about what is going to happen, just as he has always done. He should not succumb in this case, any more than he should in any other, to the temptation to let someone else do his thinking for him.

But the CED does think—and this proposition can hardly be stated too strongly — that *the businessman should take heart from this stirring expression of optimism by a representative cross-section of American manufacturing industry.*

The picture given by this study is for a single year. It is a picture for the first year of the second postwar period. Each subsequent year will bring its own special set of conditions and problems.

However, it seems clear that there will be a number of years in the second postwar period—the catching-up-with-deferred-demand-period — and that in general this should be a relatively good period as a whole if the present study is a reliable guide to the first of those years.

After the war the American economy is going to have to produce, and sell, a far greater volume of goods and services than it has ever before produced and sold in a year of peace. It is going to have to do this if there are to be jobs for the great majority of Americans who will be able and willing to work.

In considering this challenge these facts are important:

(1) The U. S. has never had substantially full employment since 1929, except in wartime.

(2) In the last more-or-less-normal peacetime year, 1939, there were about 8,900,000 unemployed out of a labor force of 54,100,000 or 16.4 pct.

(3) Between 1931 and 1940 the smallest percentage of unemployment to total labor force was about 13.8 pct, in 1937.

During the years since 1929 productivity per employed person has tended to rise, despite a temporary decline during the early thirties.

In wartime great scientific strides have been made, and many of these will ultimately be reflected in a sharp postwar rise in productivity, particularly in manufacturing. This situation, when it develops, will accentuate the problem that was already acute before the war.

1947 Selected for Study

The second postwar period, the catching-up-with-accumulated-demand period, has been the one selected for analysis. The year which has been selected within that period is the first full postwar year after a substantial element of industrial reconversion shall have taken place. The year which has been arbitrarily defined in that way for the purposes of the study is 1947.

It was desired to find out how nearly the U. S. will be able to approach, in 1947, a satisfactory solution to the problem of employment?

This of course raises the collateral question: How many persons *should* be employed in that year?

Ordinarily the labor force has increased in recent years at the rate of somewhat more than half a million persons a year, primarily as a result of population increase. The labor force is actively dynamic in that it can under special conditions be rather sharply expanded or contracted. A sharp abnormal expansion has occurred during the war. The young have left school to work or enter the armed services, the old have postponed retirement or begun to work again, and an abnormal proportion of women have worked outside the home.

In 1929 the labor force included 48,060,000 persons. By 1939 this number had been expanded to 54,106,000, an average annual expansion of about 600,000. Yet in 1944, under the impetus of war, the labor force numbered 64,010,000. In the three-year period from 1941 to 1944 it had

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Opinions of a number of authorities as to the size of the labor force in 1947 vary between 58.2 million and 62 million.

It is necessary to make an assumption as to how many persons will be in the armed forces in that year. Opinions here differ as to the amount of demobilization that can have taken place, even when the war is assumed to have finally ended well before 1947. The range of informed view seems to be from 2.0 million to 4.0 million in the armed forces in 1947.

Finally, there is the question of how many persons would constitute the permissible civilian "labor float," which is to say, persons engaged in moving from job to job or otherwise unavoidably unemployed. The range of responsible view on this is perhaps from a low figure of 1.5 million to a high of 4.0 million.

The CED has given consideration to these matters, and has selected in view of all the evidence what seem to us to be reasonable assumptions regarding the size of the labor force, the size of the armed forces and the permissible "labor float."

These assumptions are shown below, along with the minimum and maximum assumptions previously referred to:

(In Millions)

	From	To	CED's Best Guess
Total labor force	58.2	62.0	60.1
Armed forces	4.0	2.0	3.5
Civilian labor force	54.2	60.0	56.5
Permissible "labor float"	4.0	1.5	2.5
Needed civilian jobs	50.2	58.5	54.0

In summary, then, the 1947 employment goal may be visualized as follows:

	1939 (Millions)	Goal for 1947 (Millions)	Increase, Pct
Employed civilians	44.9	54.0	20.3

The CED study of the year 1947 has been devoted to measuring, so far as this can be done on the basis of a detailed study of manufacturing, probable accomplishment in 1947 against the goal.

Market Estimate Made First

The principal element in this study is a composite estimate, or forecast, by American manufacturing industry of its markets in the postwar year 1947. It was felt that the people best qualified to do the job were those most familiar with the situations and problems involved—the manufacturers themselves.

The manufacturers *were not making estimates for their individual companies.* They were to do exactly what the trade associations who cooperated with the CED were to do: that is, produce forecasts *for their industries.* These forecasts were to represent the amount of business the estimators thought would actually materialize in their respective industries.

The only assumption which was necessarily to be common to all the estimates was the very arbitrary one that 1947 would be the first full postwar year and that by that year a very substantial element of the industrial reconversion would have been completed.

The forecasts in general are very good in the opinion of CED.

However, they were made under circumstances most difficult for the forecaster. They were *long-range* forecasts, which is unusual in business practice, and there were an unusual number of unknown and intangible factors.

Nevertheless, it must be remembered that these estimates were made by *businessmen*—by men who have over the years successfully coped with their problems, and who know their industries.

As a word of caution, it should be urgently pointed out that the individual manufacturer or other businessman interested in any one line of manufacture should not take the forecast presented for that industry as his guide without doing work of his own to reinforce or disprove it.

In the individual industries the forecasts may be extremely helpful. Indeed, that is of course our hope. But they are not intended to be accepted blindly. The safest course is to use the estimate in any one line as the basis for further work.

The aggregate value of manufactures in the year 1939, which may be taken as the last more-or-less-normal pre-war year, was $56,843 millions, according to the Census of Manufactures taken in that year.

The aggregate forecast of manufactures in the hypothetical postwar year 1947, with which this study deals, is $80,515.0 millions, at the general price level of 1939. This is an increase of 41.6 pct. As between the non-durable goods industries and the durable industries, the picture is detailed in Table I.

Table II shows part of the aggregate estimate broken down into the manufacturing groups of primary interest to the metalworking industry.

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The only assumption which was necessarily to be common to all the estimates was the very arbitrary one that 1947 would be the first full postwar year and that by that year a very substantial element of the industrial reconversion would have been completed.

The forecasts in general are very good in the opinion of CED.

However, they were made under circumstances most difficult for the forecaster. They were *long-range* forecasts, which is unusual in business practice, and there were an unusual number of unknown and intangible factors.

Nevertheless, it must be remembered that these estimates were made by *businessmen*—by men who have over the years successfully coped with their problems, and who know their industries.

As a word of caution, it should be urgently pointed out that the individual manufacturer or other businessman interested in any one line of manufacture should not take the forecast presented for that industry as his guide without doing work of his own to reinforce or disprove it.

In the individual industries the forecasts may be extremely helpful. Indeed, that is of course our hope. But they are not intended to be accepted blindly. The safest course is to use the estimate in any one line as the basis for further work.

The aggregate value of manufactures in the year 1939, which may be taken as the last more-or-less-normal pre-war year, was $56,843 millions, according to the Census of Manufactures taken in that year.

The aggregate forecast of manufactures in the hypothetical postwar year 1947, with which this study deals, is $80,515.0 millions, at the general price level of 1939. This is an increase of 41.6 pct. As between the non-durable goods industries and the durable industries, the picture is detailed in Table I.

Table II shows part of the aggregate estimate broken down into the manufacturing groups of primary interest to the metalworking industry.

TABLE I

Value of Manufactures of Prices Current Each Year

(In millions of dollars)

DURABLE GOODS	1929	1931	1933	1935	1937	1939	1940	1941	1942	1943	1944	1947
Lumber and timber basic products	$ 1,827.0	$ 679.0	$ 475.0	$ 748.0	$ 1,161.0	$ 1,122.0	$ 1,387.0	$ 2,067.0	$ 2,381.0	$ 2,592.0	$ 2,357.0	$ 1,412.8
Furniture and finished lumber products	1,792.0	1,018.0	685.0	947.0	1,303.0	1,268.0	1,430.0	2,022.0	2,159.0	2,478.0	2,789.0	1,872.5
Stone, clay and glass products	1,624.0	951.0	629.0	971.0	1,428.0	1,440.0	1,685.0	2,371.0	2,632.0	2,649.0	2,680.0	2,062.6
Iron and steel and their products, except machinery	7,338.0	3,400.0	2,580.0	4,265.0	6,918.0	6,592.0	8,331.0	13,014.0	15,302.0	16,525.0	16,549.0	9,052.4
Nonferrous metals and their products	3,385.0	1,310.0	929.0	1,640.0	2,751.0	2,573.0	3,152.0	4,579.0	5,515.0	6,671.0	7,156.0	3,710.1
Electrical machinery	2,398.0	1,188.0	675.0	1,161.0	1,900.0	1,727.0	2,290.0	3,603.0	4,847.0	7,522.0	8,842.0	2,698.3
Machinery, except electrical	4,821.0	2,227.0	1,401.0	2,655.0	4,554.0	3,254.0	4,237.0	6,741.0	10,749.0	13,276.0	13,461.0	4,961.1
Automobiles and automobile equipment	5,261.0	2,513.0	1,858.0	3,942.0	5,176.0	4,048.0	5,273.0	6,913.0	6,915.0	10,839.0	12,212.0	7,117.6
Transportation equipment, except automobiles	758.0	369.0	189.0	348.0	810.0	883.0	1,566.0	4,282.0	13,561.0	22,656.0	22,266.0	1,539.1
TOTAL DURABLE	$29,204.0	$13,655.0	$ 9,421.0	$16,677.0	$26,001.0	$22,907.0	$29,351.0	$45,592.0	$64,061.0	$85,208.0	$88,312.0	$34,426.5
TOTAL NON-DURABLE	$37,558.0	$25,395.0	$20,579.0	$27,516.0	$33,689.0	$32,773.0	$35,421.0	$46,044.0	$54,798.0	$60,322.0	$64,719.0	$44,458.2
MISCELLANEOUS INDUSTRIES	$ 1,232.0	$ 779.0	$ 557.0	$ 799.0	$ 1,024.0	$ 1,163.0	$ 1,274.0	$ 1,863.0	$ 2,348.0	$ 2,950.0	$ 3,142.0	$ 1,630.3
GRAND TOTAL (all mfg. industry)	$67,994.0	$39,829.0	$30,557.0	$44,992.0	$60,714.0	$56,843.0	$66,046.0	$93,499.0	$121,207.0	$148,480.0	$156,173.0	$80,515.0

Source: National Income Unit, Bureau of Foreign and Domestic Commerce, U. S. Dept. of Commerce. Note—During the war years (1941 to 1944), naturally the products made by many of the manufacturers are not accurately described by the classifications used in this table.

*Based on general price level of 1939. Industry estimates correlated and interpreted by CED.

Thus, it is shown that American manufacturing industry believes its total value of production in 1947 (if that is the first full postwar year after reconversion) will be about 42 pct greater in physical volume than its volume in 1939.

Therefore:

(1) Can this composite estimate be translated into the manufacturing employment that would be involved?

(2) Even more important, can a reasonable judgment be made as to the volume of employment that might be expected in the economy as a whole if the manufacturing forecast materialized?

Employment Is Projected

The effort to forecast manufacturing employment is in itself very difficult.

Frankly, in attempting to go even further and make a projection for civilian employment in the economy as a whole from an analysis of manufacturing alone, the CED is on extremely debatable ground.

Both projections necessarily involve large areas of conjecture and the acceptance of some assumptions very arbitrarily arrived at. But it is believed that the effort should be made.

In 1939, 10,078,000 persons were employed in manufacturing, excluding the self-employed.

The estimated 1947 increase of about 42 pct in value of manufactures will not be reflected in a comparable increase in employment unless the amount produced per worker is the same.

How productive will each manufacturing worker be in 1947, as compared with productivity per manufacturing worker in 1939? This point is, frankly, one upon which many possible opinions can be held.

In the first place, there is no question that productivity per manhour in manufacturing has been rising steadily over many years, as a long-term trend. By 1929, manufacturing output per manhour was just about twice what it had been in 1909. In 1941, it was about 42 pct *greater* than it had been in 1929.

The increase from 1929 to 1941 averages about 3 pct a year, compounded. In fact, going all the way back to 1909 the annual rate of increase between that year and 1941 also averages around 3 pct, compounded, provided the period during and immediately after the last war is ignored.

Apparently 1941 was the high point in manhour productivity, with a de-

crease each year since then in those industries which have continued in civilian goods production. The indications are that 1944 may have dropped back to the 1940 level or even lower.

In looking at the period after the war, students of this problem disagree as to whether the prewar trend will eventually reassert itself or not. Some people expect productivity to increase after the war "geometrically" (that is, with a regular rate of increase), and at the prewar rate. Others think that before the war there were already signs that the rate of increase was slackening.

Some people think the war has taught such great productive lessons that, after a period of learning to put wartime improvements to work on peacetime goods, U. S. productivity per manhour will catch up, and be as great as it would have been if there had been no war.

But no one—so far as CED knows—thinks at present that by the postwar year 1947 will the country be able to accomplish anything like that. And the big question under consideration is: What will have happened to productivity per manhour in manufacturing by 1947?

The judgment of CED is that by

TABLE II

How Industry Estimates Metals Industry Markets in 1947

IRON AND STEEL AND THEIR PRODUCTS, EXCEPT MACHINERY

Industry	Value of Manufactures at the 1939 Price Level (Millions of Dollars) 1939	Estimated 1947	% Increase Estimated 1947 over 1939
Blast furnace products	$ 550.8	$ 716.0	30.0%
Steel works and rolling mills	2,720.0	3,680.5	35.3
Gray-iron and semisteel castings	209.7	291.8	39.2
Malleable-iron castings	53.5	74.2	38.7
Steel castings	135.5	219.9	62.3
Cast-iron pipe and fittings	65.1	91.2	40.1
Tin cans and other tinware not elsewhere classified	372.6	524.4	40.7
Wire drawn from purchased rods	176.5	223.1	26.4
Nails, spikes, etc., not made in wire mills or in plants operated in connection with rolling mills	12.9	14.4	11.6
Wirework not elsewhere classified	158.8	203.0	27.8
Cutlery (except aluminum, silver and plated cutlery) and edge tools	59.9	78.3	30.7
Tools (except edge tools, machine tools, files and saws)	75.3	97.9	30.0
Saws	18.5	26.3	42.2
Hardware not elsewhere classified	154.5	213.9	38.4
Enameled-iron sanitary ware and other plumbers' supplies (not including pipe and vitreous and semivitreous china sanitary ware)	125.6	181.7	44.7
Oil burners, domestic and industrial	18.5	32.7	76.8
Power boilers and associated products	141.0	180.5	28.0
Steam and hot-water heating apparatus (including hot-water furnaces)	45.4	61.0	34.4
Stoves, ranges, water heaters and hot-air furnaces (except electric)	223.4	317.5	42.1
Steam fittings, regardless of material	112.0	151.2	35.0
Heating and cooking apparatus, except electric, not elsewhere classified	20.3	38.6	90.1
Automobile stampings	47.8	62.8	31.4
Stamped and pressed metal products (except automobile stampings)	178.4	281.6	57.8
Fabricated structural steel and ornamental metal work, made in plants not operated in connection with rolling mills	284.7	366.3	28.7
Doors, window sash, frames, molding, and trim (made of metal)	48.2	84.1	74.5
Bolts, nuts, washers, and rivets—made in plants not operated in connection with rolling mills	84.1	114.7	36.4
Forgings, iron and steel—made in plants not operated in connection with rolling mills	104.9	164.8	57.1
Screw-machine products and wood screws	82.8	134.0	61.8
Firearms	17.7	23.1	30.5
Cold-rolled steel sheets and strip and cold-finished steel bars made in plants not operated in connection with hot-rolling mills	70.4	104.9	49.0
All other	222.8	298.0	33.8
Total Iron and Steel and Their Products, Except Machinery	$6,591.5	$9,052.4	37.3%

NONFERROUS METALS AND THEIR PRODUCTS

Industry	1939	Estimated 1947	% Increase Estimated 1947 over 1939
Primary smelting and refining of nonferrous metals	$ 956.6	$1,163.9	21.7%
Alloying; and rolling and drawing of nonferrous metals, except aluminum	445.1	564.3	26.8
Secondary smelting and refining, gold, silver, and platinum	101.8	140.0	37.5
Secondary smelting and refining of nonferrous metals, not elsewhere classified	82.0	133.3	62.6
Clocks, watches, and materials and parts (except watch-cases)	84.8	136.1	60.5
Silverware and plated ware	62.8	127.1	102.4
Lighting fixtures	124.6	157.8	26.6
Nonferrous metal foundries (except aluminum)	55.6	72.9	31.1
Aluminumware, kitchen, hospital, and household (except electrical appliances)	37.1	59.4	60.1
Aluminum products (including rolling and drawing and extruding), not elsewhere classified	169.8	524.4	208.8
Nonferrous metal products not elsewhere classified	141.8	195.4	37.8
All other	310.9	435.5	40.1
Total Nonferrous Metals and Their Products	$2,572.9	$3,710.1	44.2%

ELECTRICAL MACHINERY

Industry	1939	Estimated 1947	% Increase Estimated 1947 over 1939
Wiring devices and supplies	$ 94.3	$ 137.5	45.8%
Carbon products for the electrical industry, and manufactures of carbon or artificial graphite	18.4	27.8	51.1
Electrical measuring instruments	41.8	56.3	34.7

ELECTRIC MACHINERY—Continued

Industry	1939	Estimated 1947	% Increase Estimated 1947 over 1939
Generating, distribution, and industrial apparatus, and apparatus for incorporation in manufactured products, not elsewhere classified	470.5	787.3	67.3
Electrical appliances	145.7	244.4	67.7
Insulated wire and cable	120.4	168.0	39.5
Automotive electrical equipment	109.8	145.3	32.3
Electric lamps	84.8	123.2	45.3
Radios, radio tubes, and phonographs	275.9	499.9	81.2
Communication equipment	191.3	275.7	44.1
Batteries, storage and primary (dry and wet)	117.8	151.5	28.8
X ray and therapeutic apparatus and electronic tubes	17.9	26.7	49.2
Electrical products not elsewhere classified	39.0	54.7	40.3
Total Electrical Machinery	$1,727.4	$2,698.3	56.2%

MACHINERY, EXCEPT ELECTRICAL

Industry	1939	Estimated 1947	% Increase Estimated 1947 over 1939
Steam engines, turbines, and water wheels	$ 24.8	$ 36.3	46.4%
Internal combustion engines	110.4	167.6	51.8
Tractors	254.0	436.6	71.9
Agricultural machinery (except tractors)	167.9	300.2	78.8
Construction and similar machinery (except mining and oil-field machinery and tools)	140.1	211.4	50.9
Oil-field machinery and tools	89.0	115.9	30.2
Mining machinery and equipment	33.8	39.3	17.0
Machine tools	218.0	278.5	27.8
Machine-tool and other metal working machinery accessories, metal-cutting and shaping tools, and machinists' precision tools	125.6	190.1	51.4
Metalworking machinery and equipment, not elsewhere classified	99.0	132.7	34.0
Food-products machinery	90.8	147.7	62.7
Textile machinery	93.3	145.8	56.3
Paper-mill, pulp-mill, and paper-products machinery	32.4	44.3	36.7
Printing-trades machinery and equipment	55.6	109.5	96.9
Special industry machinery, not elsewhere classified	55.8	87.1	56.1
Measuring and dispensing pumps	44.3	53.4	20.5
Pumping equipment and air compressors	134.9	195.6	45.0
Elevators, escalators, and conveyors	84.1	105.7	64.9
Cars and trucks, industrial	17.3	35.3	104.0
Blowers; exhaust and ventilating fans	28.8	44.2	54.5
Measuring instruments, mechanical (except electrical measuring instruments, watches and clocks)	39.7	50.7	27.7
Mechanical power-transmission equipment	170.3	256.3	50.5
Machine shop products not elsewhere classified	360.3	477.0	32.4
Industrial machinery not elsewhere classified	140.6	219.3	56.0
Office and store machines not elsewhere classified	150.2	202.5	34.8
Vending, amusement and other coin-operated machines	23.1	48.7	110.8
Scales and balances	14.4	18.4	27.8
Laundry equipment, domestic	61.6	111.1	80.4
Commercial laundry, dry-cleaning and pressing machinery	21.8	35.0	60.6
Refrigerators, domestic (mechanical and absorption), refrigeration machinery and equipment and complete air-conditioning units	278.6	438.5	57.4
All other	114.1	226.4	98.4
Total Machinery, Except Electrical	$3,254.2	$4,961.1	52.5%

AUTOMOBILES AND AUTOMOBILE EQUIPMENT

Motor vehicles, motor-vehicle bodies, parts and accessories	$4,039.9	$6,777.7	67.8%
Automobile trailers (for attachment to passenger cars)	7.9	10.1	27.8
Total Automobiles and Automobile Equipment	$4,047.9	$6,787.8	67.7%

TRANSPORTATION EQUIPMENT, EXCEPT AUTOMOBILES

Locomotives (including frames) and parts; railroad, mining and industrial	$ 47.4	$ 109.0	129.9%
Cars and car equipment—railroad, street and rapid-transit	168.4	360.8	114.3
Aircraft and parts, including aircraft engines	279.5	552.4	97.6
Shipbuilding and ship repairing	327.4	403.8	23.3
Boatbuilding and boat repairing	10.9	25.8	136.7
All other	49.3	87.3	77.1
Total Transportation Equipment, Except Automobiles	$ 882.9	$1,539.1	74.3%
GRAND TOTAL (all manufacturing industry)	$56,843.0	$80,515.0	41.6%

TABLE III

The Labor Force in Past Years and Projected for 1947

(In Thousands)

EMPLOYMENT	1929	1931	1933	1935	1937	1939	1940	1941	1942	1943	1944	1947*
Non-agricultural employees												
Manufacturing	10,534	8,021	7,258	8,907	10,606	10,078	10,780	12,974	15,051	16,924	16,121	13,500
Mining	1,078	864	735	888	1,006	845	916	947	970	891	835	......
Construction	2,122	1,470	881	1,181	1,575	1,753	1,722	2,236	2,079	1,259	679	......
Transportation and public utilities	3,907	3,243	2,659	2,771	3,114	2,912	3,013	3,248	3,433	3,619	3,761	......
Trade	6,246	5,439	4,916	5,610	6,424	6,618	6,906	7,378	7,263	7,030	7,044	......
Finance, service and miscellaneous	4,203	3,830	3,462	3,797	4,195	4,160	4,310	4,438	4,447	4,115	4,348	......
Government	3,059	3,258	3,149	3,445	3,707	3,988	4,136	4,446	5,203	5,890	5,911	......
Total	31,149	26,125	23,060	26,599	30,627	30,354	31,784	35,668	38,447	39,728	38,698	......
Total civilian employment	46,304	41,099	37,517	41,186	45,254	44,884	46,397	49,090	52,110	52,410	51,780	53,500
Unemployment	1,494	7,905	12,629	10,215	7,269	8,853	7,669	5,010	2,380	1,070	840	2,500
Total civilian labor force	47,798	49,004	50,146	51,401	52,523	53,737	54,066	54,100	54,490	53,480	52,620	56,000
Armed forces	262	260	252	269	322	369	535	1,630	3,940	8,980	11,390	3,500
Total labor force	48,060	49,264	50,398	51,670	52,845	54,106	54,601	55,730	58,430	62,460	64,010	59,500

Source: Preliminary estimates of the Bureau of Labor Statistics of the U. S. Department of Labor and estimates of the Bureau of the Census of the U. S. Department of Commerce. Note: The difference between the total of non-agricultural employees and total civilian employment is accounted for by agricultural employment, self-employment and an adjustment for duplication and incomparabilities.

*Theoretical first full postwar year. Projection of employment is by CED based on estimate of manufacturing volume by industry.

1945 output per manhour in manufacturing will have dropped nearly to the level of 1939. The feeling is that 1946 will see productivity at about the 1945 level. If 1947 is the first postwar year, as assumed by the estimators who aided in this study, it is believed that output per manhour in manufacturing in that year will increase above the 1945-46 level and *will be about 6 pct above the 1939 level.*

There is next the question of work hours to be considered. Here the study is on even more unsteady ground. Will manufacturing workers put in, "on the average," more or fewer work hours in 1947 than in 1939, or about the same? Perhaps as good a judgment as any is that the hours will be just about what they were in 1939—if anything they might be a little lower.

Assuming no change in work hours, then, but assuming 6 pct increase in output per manhour over 1939, the following is obtained:

Year	Annual Output Per Mfg. Employee (At 1939 Prices)
1939..........	$5640
1947..........	$5978

If this assumption is realistic, and if the value of manufactures totals $80,515.0 millions (at 1939 prices), manufacturing in 1947 would employ 13,469,000 persons, excluding the self-employed.

This figure would represent an increase of 33.7 pct over 1939, in which year 10,078,000 persons were employed in manufacturing, excluding the self-employed.

To sum up: Value of manufactures would be up about 42 pct. Employment in manufactures would be up about 34 pct.

The problem is now to "project" an estimate for the rest of the economy from the foregoing material on the manufacturing segment.

Peacetime manufacturing activities during the period from 1929 through 1940 accounted for from 18 pct to 23.4 pct of civilian employment. In 1941, under an economy partially converted to war production, the percentage was 26.4. It rose to 28.9 pct in 1942, and to 32.3 in 1943. In 1944 it fell off to 31.1. In 1939 manufacturing provided jobs for 22.5 pct of the civilians employed: it was the largest single component of the labor force.

It is a fact that beginning with 1929 and until the economy began to take on wartime characteristics in 1941, manufacturing employment never reached 23.5 pct of civilian employment. It is true, too, that in 1929, a boom year, the figure was only

22.7 pct. Such considerations might with considerable logic lead to the opinion that in 1947 the manufacturing employment total arrived at above (13,469,000 persons) would not be more than 23.5 or 24 pct of civilian employment.

And so indeed it may not.

But it is also true that this particular percentage has tended in the past to be high when total civilian employment was high, and lower when total civilian employment was lower.

It is possible to project the prewar relationship between manufacturing employment and total civilian employment, by mathematical methods, and when this is done it is strongly suggested that a figure of 25 pct or even a little higher, may be reached, especially when it is considered that 1947 will be a year of filling accumulated demand for manufactured goods.

In view of everything, the CED has decided that manufacturing in 1947 should perhaps be assumed for present purposes to account for 25.2 pct of total civilian employment.

On this basis, the study arrives at the following:

(1) If 13,469,000 persons were employed in manufacturing, excluding the self-employed, then

(2) The total number of employed civilians might be about 53,448,000. (See Table HI.)

It is possible to argue rather convincingly for other conclusions than that presented as to the probable ratio of manufacturing employment to total civilian employment. How different the result would be, in total civilian employment, if some other ratio than 25.2 pct were to be accepted, can be seen from the fact that a change of only 0.5 pct in the ratio produces a change, up or down as the case may be, of about one million persons in the civilian employment total.

In the opinion of CED the truth of this matter may best be expressed as follows:

(1) Starting with business' own estimate of the value of manufactures in 1947 ($80,515.0 millions at 1939 prices)

(2) The best (and very rough) guess as to the attendant level of total civilian employment is around 53.5 millions.

(3) Actually civilian employment anywhere between 51 and 57 million would be entirely possible and reasonable if the value of manufactures reached the indicated level.

Going back to the estimate of how many civilian jobs would be needed in 1947, the following comparison is obtained:

(In Millions)

	From	To	CED's Best Guess
Needed civilian jobs, 1947...	50.2	58.5	54.0
Projection of available civilian jobs, 1947.....	51.0	57.0	53.5

The needed jobs and the available jobs come into virtual balance at both ends of the suggested range, as well as in the figures chosen as "CED's best guess." Nevertheless, the table emphatically does not mean that, granting industry's estimate of the value of manufactures materializes, substantially full employment is inevitable in the postwar year in question.

Why not?

(1) Because, for one thing, it is possible that the best estimate of needed jobs is 58.5 million and the best projection of available jobs 51 million.

(2) And it is equally possible that the best estimate of needed jobs is 50.2 million and the best projection of available jobs 57 million.

(3) Thus the possibilities could conceivably range from a considerable amount of unemployment to a state in which the number of jobs would greatly exceed the number of people wanting them.

So much for the possibilities. The probabilities are another matter.

As shown in the right-hand column of the table, CED's best guess is that if the level of manufacturing volume foreseen by American manufacturing industry materializes, we shall have substantially full employment in the hypothetical postwar year 1947.

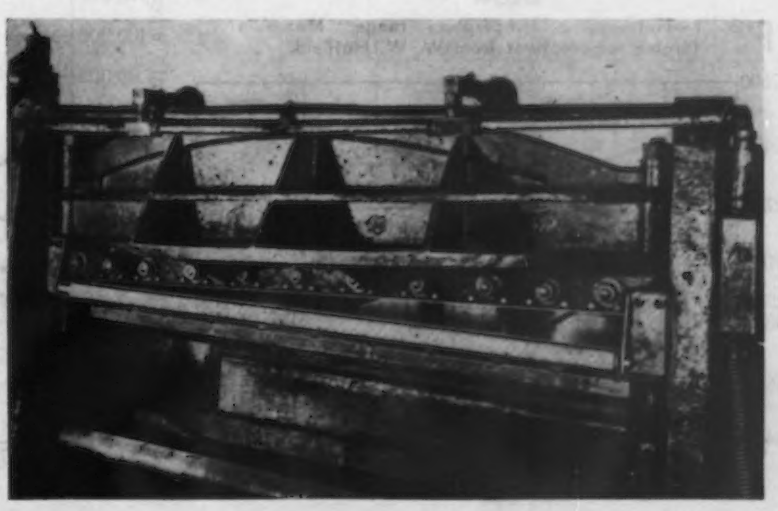
On this basis the CED has a clear and strong foreshadowing of an excellent first postwar year for both business and employment.

Roller Attachment for Shear Prevents Scratches

A ROLLER attachment added to a shear at the Westinghouse Appliance Division, Mansfield, Ohio, has decreased production costs and eliminated scratches during the cutting of large aluminum sheets.

Without this roller, three operators were required to feed the sheets from a table at the back to the operator at the front of the shear. When the sheets were fed into the shear frequently they would rub against the bottom blade causing deep scratches which made it necessary to polish the sheets before they could be used. One operator was eliminated at the back of the shear and the scratches were almost entirely eliminated by the addition of the roller.

After the holding plates are attached to the machine, the roller is easy to mount or dismantle as there are only two bolts holding it in position. The roller is attached to the top blade so that it is positioned 1/16 in. above the bottom blade when the former is in the "up" position. This allows the aluminum sheet to be rolled over the bottom blade without scratching it.



Automotive Bolts

. . . Materials for automotive bolts must combine the properties of plasticity and high yield strength. Since these two properties are in opposition to each other, a compromise must be made in selecting the best functioning material. In this two-part article, of which this is the first, the properties of low and medium-carbon steels and alloy steels as applied to the fabrication of bolts by hot forming or cold heading are discussed.

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By A. S. JAMESON
Works Metallurgist, International Harvester Co., Chicago.

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ALTHOUGH in recent years manufacturing of automotive bolts has become rather standardized, the metallurgist still seeks further development of old and new principles. Research is being carried out to discover improvements in manufacturing methods leading to the production of a better bolt, a bolt more adapted to its engineering function, that of a fastening device.

It is desirable that fastening devices have a high or moderate degree of plasticity. Plasticity is defined by Jeffries as "the quality by virtue of which a substance may undergo a permanent change in shape without rupture." Plasticity is a desirable feature in a fastening device because should some unusual load be applied tending to disconnect the two members held together by the device, it is better that their severance be gradual rather than sudden. This being the case, bolts are rarely made from high-carbon steel but rather from low-carbon steel or from medium-carbon steel heat treated to produce a moderate degree of plasticity. However, plasticity is not the only property sought for in a bolt, for it is necessary that a fastening device have a high yield strength so that it holds the connected members together firmly. It is unfortunate that plasticity and high yield strength are mutually opposed to one another so that a compromise must be made.

In speaking of metallurgical principles in relation to bolt materials it must be borne in mind that historic background and manufacturing cost also influence the choice of a material.

There are two methods of shaping bolts, hot forming and cold forming.

In earlier days, the materials available for bolts were limited. The method of forming the heads was confined to hot forging. The hot formed bolts were descaled and the threads were cut in dies. To the present day, bolts are still hot formed for short runs in the larger sizes, and where the bolts are too long to be cold headed in automatic machines. The division between cold heading and hot heading, as far as size is concerned, is made at ¾ in. in diam and 6 in. in length, bolts over these dimensions being hot headed. A machine which hot heads and rolls the threads on a blank in one heat cycle is the highest development in the mechanics of hot forming.

There is no restriction as to the materials that may be hot formed; in fact, all the materials used for bolts are hot formed at one time or another. There is one controlling principle and

RIGHT

FIG. 2—Effect of carbon content on the tensile properties of steel.

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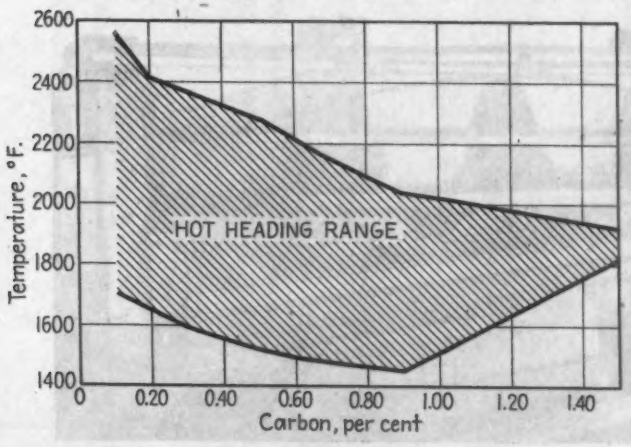
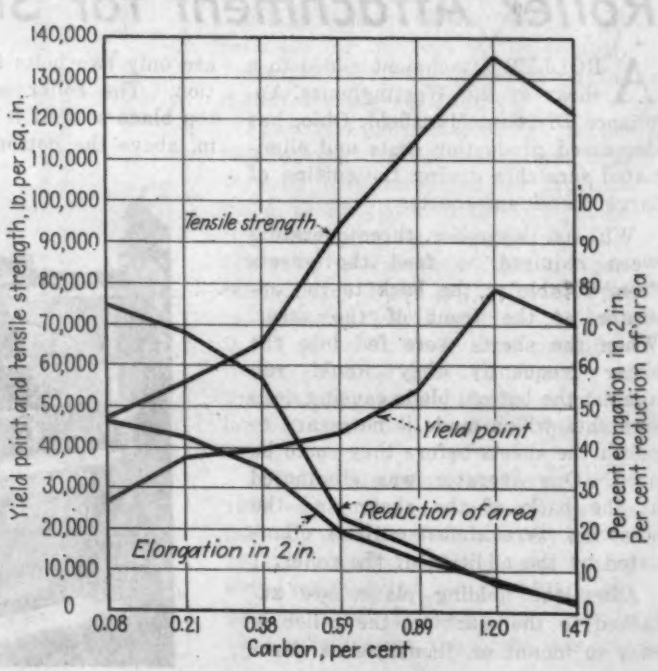
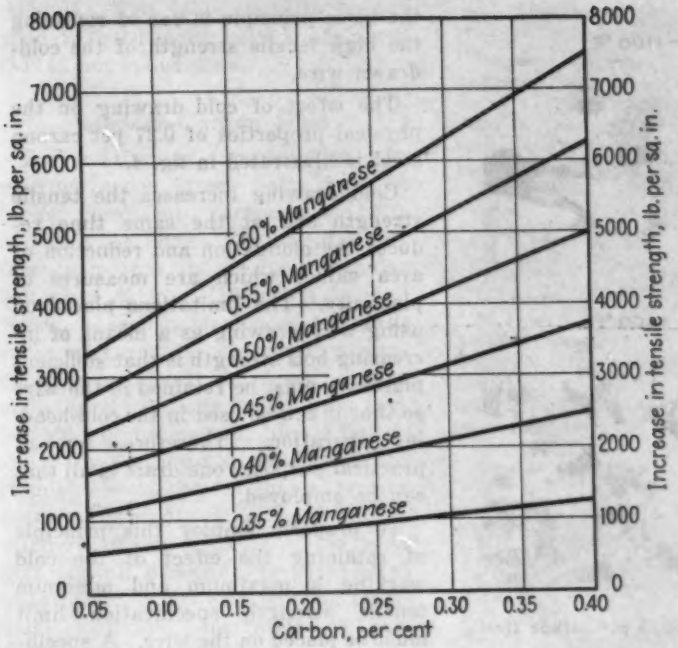
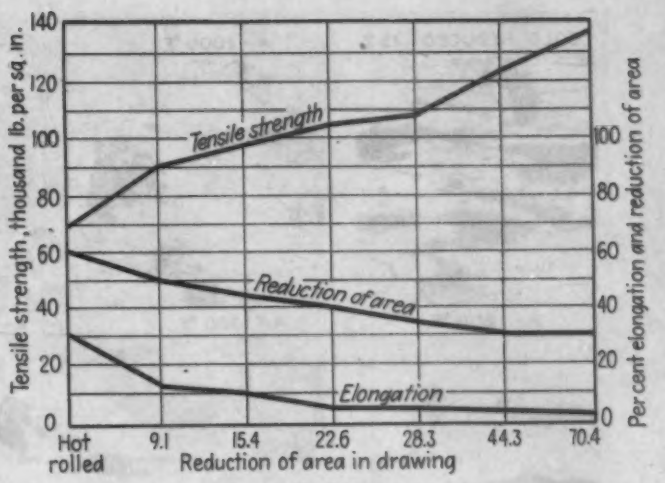
BELOW

FIG. 1—Hot-heading temperature range. Maximum forging temperatures from W. W. Hatfield.









ABOVE

FIG. 4—Effect of cold drawing on the tensile properties of 0.27 pct carbon steel.

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LEFT

FIG. 3—Increase in tensile strength obtained by the addition of manganese to steels of various carbon content.

that is the forging temperature. The carbon content of the material is the primary element which governs the forging temperature range. The hot-heading temperature range is shown in fig. 1. It will be seen from this figure that the temperature range for steels containing up to 0.50 pct carbon is quite wide.

The mechanical properties of hot-formed bolts, that is, assuming that they are not heat treated after forming will be that of air cooled steel. table I gives typical materials used for hot-formed bolts which are used in the unheat-treated condition with their approximate tensile properties. The tensile values shown in table I will vary considerably depending on the austenitic grain size of the steel and on the cooling rate after the bolts leave the header.

The most obvious way to increase the strength of a hot-formed bolt is to increase the carbon content. The manganese content may also be increased. Data by Edwards showing the effect of increasing carbon content on the tensile strength of steel are given in fig. 2.

As the carbon content increases, the tensile strength increases with a corresponding decrease in the elongation and reduction of area values. Data by Edwards showing the effect of manganese additions to steels containing from 0.05 to 0.40 pct carbon are shown in fig. 3.

The addition of carbon and manganese would cease when their addition reduced the plasticity of the bolts to an unsafe limit. In practice, however, the limitation would come when it became economically undesirable to thread the bolt.

It should be understood that the majority of hot-headed bolts are cut threaded in the cold state. This is why sulphurized steels are used for hot-headed bolts in order to provide for relatively easy threading.

The stock for hot-headed bolts is purchased as hot-rolled bolt rounds which are held to closer OD limits than regular hot rolled bars. This is done to insure the correct basic major diameter of the thread and to protect the threading dies.

Cold-Formed Bolts

The most popular method of manufacturing bolts is by the cold-heading process. In this process the material is used in the form of cold-drawn wire. A discussion of the material can be conveniently divided into two sections, low carbon and medium carbon.

Low Carbon: The advantages of using a low-carbon steel are that the initial cost of the material is lower, and the processing cost of heading, trimming and threading is less. However, the disadvantage is that the tensile strength is not as great as can be obtained from a medium-carbon steel heat treated.

A basic openhearth semikilled steel of the following analysis is the most commonly used:

	Pct.
Carbon	0.15 to 0.20
Sulphur	0.050 max
Manganese	0.60 to 0.90
Phosphorus	0.040 max

conforming to the AISI C-1018 specification.

In the utilization of this material

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FIG. 5—Tensile strength of 0.17 pct carbon steel bolts cold headed and process annealed.

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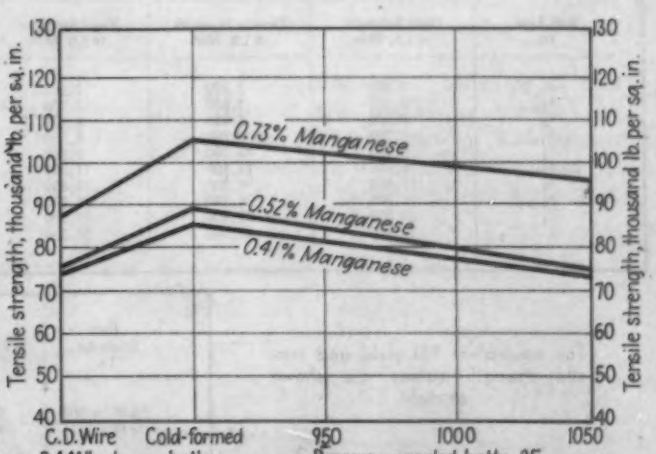

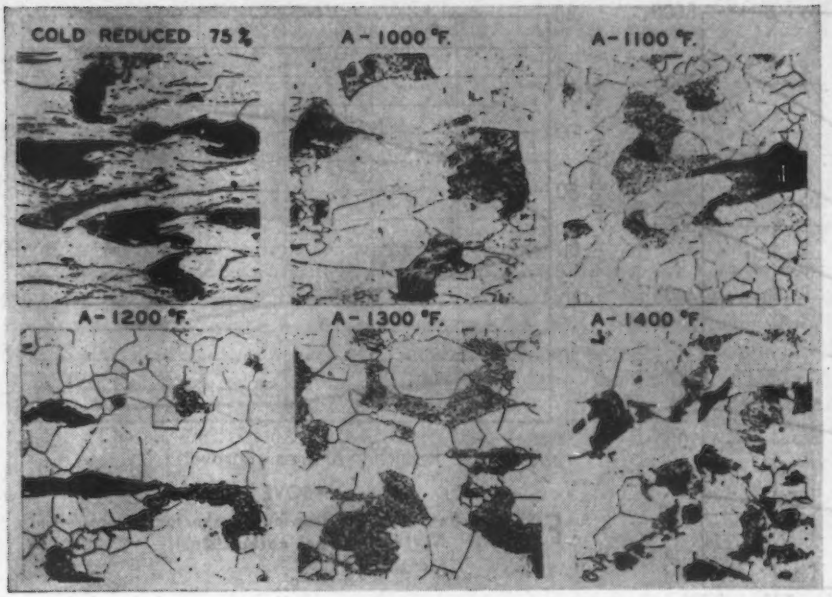

FIG. 6—Effect of annealing on the microstructure of cold worked 0.18 pct carbon steel. Etched in nital, at 300 X.

TABLE I
Typical Materials Used for Hot-Formed Bolts and Their Approximate Tensile Properties

Type	AISI No.	Chemical Composition, Pct				Tensile Properties				
		C	Mn	S	P	Yield Strength, PSI	Tensile Strength, PSI	Elongation, Pct in 2 In.	Area Reduction, Pct	Rb Hardness
Low Carbon.....	C-1017	0.17	0.50	0.025	0.015	33,000	60,000	40	70	65
	C-1018	0.18	0.75	0.030	0.015	38,000	68,000	35	65	70
Sulphurized carbon...	C-1115	0.15	0.85	0.100	0.015	40,000	65,000	35	60	70
Bessemer.....	B-1112	0.12	0.85	0.200	0.110	50,000	75,000	30	55	80
Sulphurized carbon...	C-1117	0.17	1.20	0.100	0.015	50,000	75,000	32	60	85
Medium carbon.....	C-1040	0.40	0.75	0.025	0.015	60,000	85,000	27	52	88
	C-1045	0.45	0.75	0.015	0.020	62,000	90,000	25	50	90
Sulphurized carbon...	C-1141	0.41	1.40	0.100	0.015	65,000	95,000	22	48	95

TABLE II
Minimum Tensile Strength Requirements for C-1018 Cold-Formed and C-1141 Hot-Formed Bolts

Bolt Size, In.	Coarse (NC) Thread		Fine (NF) Thread	
	Yield Strength, in Lb, Min	Tensile Strength, in Lb, Min	Yield Strength, in Lb, Min	Tensile Strength, in Lb, Min
1/4	1,800	2,300	2,100	2,600
5/16	3,000	3,800	3,300	4,200
3/8	4,500	5,600	5,100	6,300
7/16	6,200	7,700	6,900	8,600
1/2	8,200	10,200	9,300	11,500
9/16	10,600	13,100	11,800	14,600
5/8	13,100	16,300	14,800	18,400
3/4	17,700	24,200	19,800	25,000
7/8	24,500	30,900	27,000	34,100
1	32,100	40,600	36,000	45,600

The equivalent PSI yield and tensile strength values are shown at right.

Bolt Diameter, In.	Yield Strength, PSI	Tensile Strength, PSI
1/4 to 5/8 incl.	58,000	72,000
3/4 to 1	53,000	67,000

the basic principle is one of retaining the high tensile strength of the cold-drawn wire.

The effect of cold drawing on the physical properties of 0.27 pct carbon steel is illustrated in fig. 4.

Cold drawing increases the tensile strength and at the same time reduces the elongation and reduction of area values which are measures of plasticity. The limitations placed on using wire drawing as a means of increasing bolt strength is that sufficient plasticity must be retained in the wire so that it can be used in the cold-heading operation. Therefore, for all practical purposes one draft is all that can be employed.

To properly employ this principle of retaining the effect of the cold working a maximum and minimum tensile strength specification limit must be placed on the wire. A specification which is in use reads as follows:

Tensile Strength PSI		Elongation Pct in 2 In.	Reduction of Area,
Min	Max	Min	Min
70,000	90,000	15.0	50.0

After cold heading, the bolts are given a process anneal to return a certain degree of plasticity to the highly cold-worked head of the bolt. The threaded section of the bolt which represents the tensile strength of the bolt is also somewhat reduced by this process anneal. An illustration of the process from the mechanical standpoint is shown in fig. 5.

Recrystallization is visible microscopically when cold-formed bolts are process annealed at 1000°F. A complete illustration of the effect of annealing on an 0.18 pct carbon steel cold reduced in one dimension 75 pct, is shown in fig. 6. P. Goerens has shown that the flexibility of a cold-worked low-carbon steel is restored by heating to about 925°F. (See fig. 7.)

To return to the statement that a process anneal is necessary to restore plasticity to the cold-worked head of the bolt, this statement is subject to modification to the extent that if special precautions are taken such as using a heavier gage wire and later extruding the bolt blank in the threaded section, a process anneal may not be necessary. Thus, a bolt having a tensile strength of 100,000 psi may be produced by cold work and safely used.

In bolt sizes up to and including 1 in. in diam, a minimum tensile test requirement is maintained for cold-headed and process-annealed bolts made from C-1018 cold-drawn wire. These requirements are shown in

table II. This table can also be applied to hot-headed bolts made from C-1141 hot rolled steel.

Medium-Carbon Steel

For clarity of presentation the medium-carbon steel bolts can be broken down into carbon steel bolts and alloy steel bolts. The essential difference is that in the more popular bolt sizes ⅜ in., 7/16 in., ½ in. and ⅝ in., a carbon steel does not have sufficient hardness penetration to produce a completely hardened section and, therefore, bolts made from carbon steel do not have as high a tensile value for the same surface hardness. It might be suggested that a severer quench be used. This, however, so often results in cracking of the bolts that for all practical purposes it is undesirable to aim at producing maximum hardness penetration by this means.

Carbon Steel Bolts: The chemical and austenitic grain size specification of the cold-drawn wire for cold-headed carbon steel bolts is shown in table III.

This wire is purchased in the form of cold drawn wire to a diameter tolerance of ±0.002 in. The wire tolerance within any one coil is within a total tolerance of 0.001 in. These desirable conditions are obtained by drawing through carbide dies. The wire size tolerance is quite important with this material as the life of heading dies is a more important consideration than it is in the cold heading of low-carbon steel wire.

Good die life is also dependent on having a good finish on the wire. Finishes are usually produced by pickling and drawing with aluminum stearate or some other similarly acting material. The die life can be increased by 50 pct when careful attention is paid to wire finish.

In order to maintain good die life and to insure uniform heading properties, medium-carbon wire is treated before cold drawing by either annealing above the Ac range (1450° to 1650°F) or annealing below the Ac range (1280° to 1380°F). The first treatment produces a pearlitic structure and the second a spheroidized structure. See fig. 8.

The lower temperature treatment is more time-consuming than the higher temperature treatment. As to the relative merits of the two treatments, there is no doubt that the spheroidized structure has superior heading properties, but in the case of bolt heading the high temperature anneal is quite good enough, except for alloy steels. From frequent tests no difference in heading die life is detected. It is said by some that the response to heat treatment is different. Again from many tests, it has been concluded that there is no practical difference.

RIGHT

FIG. 7—Effect of the reheating temperature on the ability of a low-carbon steel to resist rupture by reversed bending. (From P. Goerens.)

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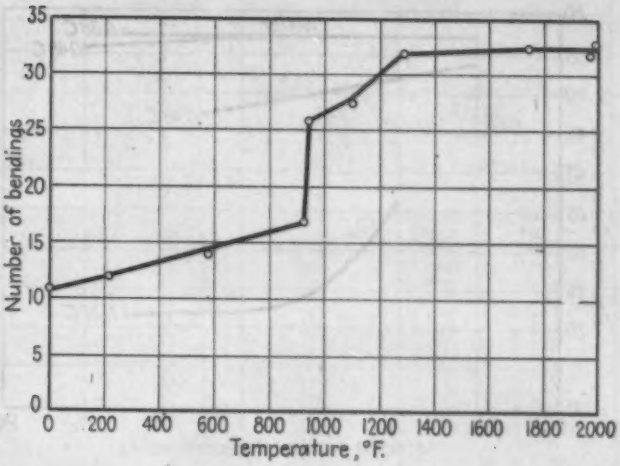
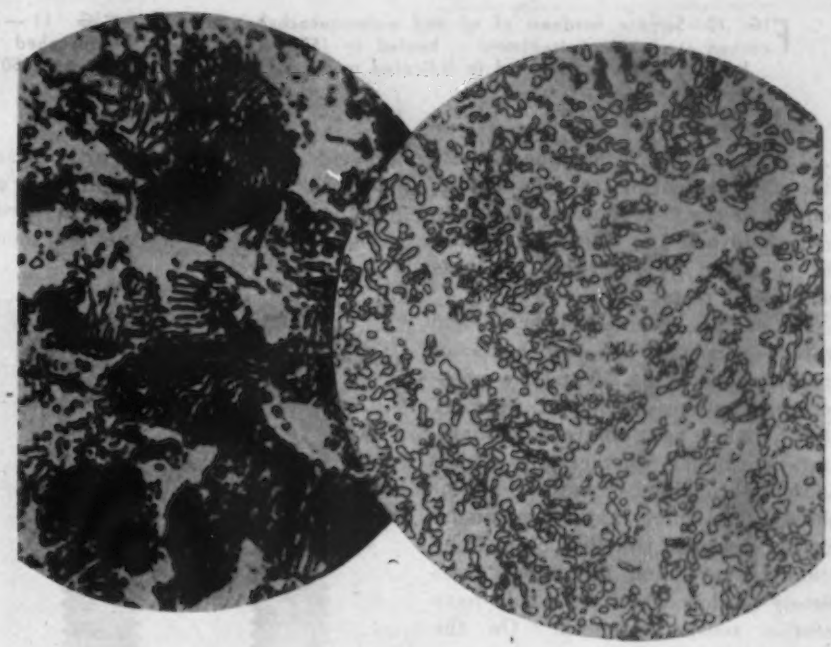
BELOW

FIG. 8—Microstructure of 0.40 pct carbon cold drawn bolt wire. Left, pearlitic structure; right, spheroidized. Etched in picral and at 1000 X.





The wire is usually purchased to a maximum tensile strength requirement and a minimum elongation or reduction of area requirement. A typical requirement is as follows:

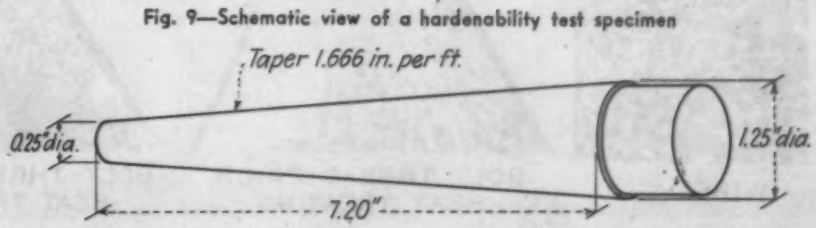
Wire Diameter, In.	Tensile Strength, PSI Max	Reduction of Area, Pct Min	Hardness Rb Max
Over 0.430	105,000	35	90
0.430 and under	115,000	35	95

Before proceeding with details of the heat treatment of these carbon steel bolts it might be well to consider a few of the fundamentals involved in the practice.

In order to produce the maximum physical properties it is necessary to completely harden the cross-section of the bolt in the quenching operation. This as well as involving the rate of cooling, controlled by the quenching medium, also involves the hardness penetration characteristics of the steel.

The hardenability behavior of two heats of steel, one containing 0.38 pct carbon, 0.85 manganese, 0.26 silicon, representing the top carbon content of the C-1035 range and one containing

Fig. 9—Schematic view of a hardenability test specimen



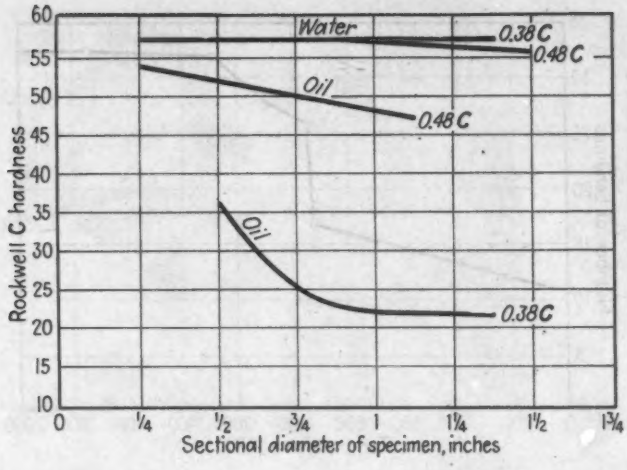


FIG. 10—Surface hardness of oil and water-quenched carbon steel. Heat treatment = heated to 1550° F, held 35 min and quenched in indicated media.

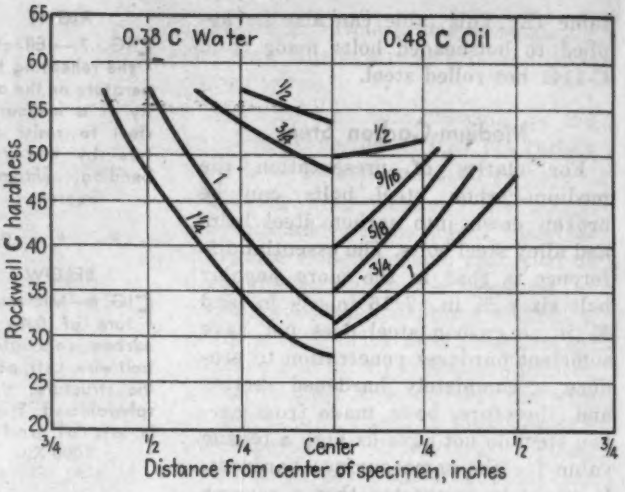


FIG. 11 — Hardness penetration of oil and water-quenched carbon steel. Heat treatment = normalized at 1650° F, heated to 1550° F, held 35 min and quenched in indicated media.

0.47 pct carbon, 0.70 manganese, 0.27 silicon, representing the top carbon content of the C-1040 range, is shown in figs. 10 and 11. Fig. 9 illustrates the specimen used for the hardness penetration tests.

The surface hardness after oil and water quenching the two heats of steel is shown in fig. 10 and the cross-sectional hardness in fig. 11. Fig. 11 shows that a slight difference in diameter determines whether the section hardens throughout or hardens incompletely. Assuming that the maximum tensile strength is only obtained by complete hardening then the incompletely hardened sections would have inferior tensile strength. On the other hand, in the case of water quenching, a quench which produced a completely hardened section would be dangerous from the standpoint of quench cracking.

Fig. 12 shows the appearance of a quench crack in a bolt which resulted from water quenching a steel with too high a hardenability.

Now as to the heat treatment of the medium-carbon bolts made from C-1035 or C-1040 steel. The usual hardening temperature is 1550°F. The most modern equipment for hardening includes atmosphere control to prevent scale formation and decarburization. However, regardless of whether atmosphere controlled hardening furnaces are used or not there

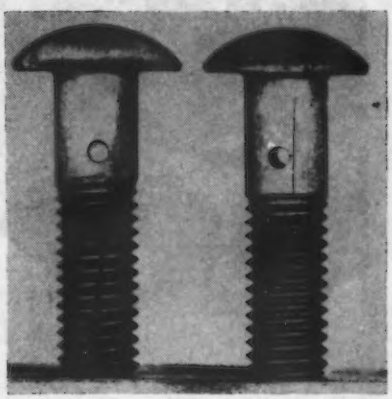


FIG. 12—The bolt on the left shows a quenching crack in the threaded portion. The bolt on the right has a seam which may often be mistaken for a quenching crack.

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will be a certain degree of decarburization, for the bolt wire itself is decarburized due to oxidizing conditions existing in wire manufacture. The amount of decarburization on the wire must be controlled within reasonable limits. The limits usually specified are 0.008 in. max totally decarburized and 0.015 in. max totally and partially decarburized.

A good deal of work is going on relating to the recarburization of wire by the use of special furnace atmospheres during the normalizing or spheroidizing cycle. This, however, may have a detrimental effect on the heading properties of the wire in these respects: (1) The full carbon content at the surface of the wire may induce more die wear; (2) the seams found at the surface of wire would have a greater tendency to split open in the heading operation where the wire has been recarburized. Perhaps the best way of proceeding to eliminate decarburization from affecting the fatigue strength of the bolt, for it has been determined that fatigue strength is materially affected by decarburization, is to recarburize in the hardening furnace. This, however, presents quite a problem in atmosphere control and may call for a longer hardening cycle.

Fig. 13 illustrates decarburization on wire and bolt threads.

Bolts are quenched either in oil or water with the object of hardening the

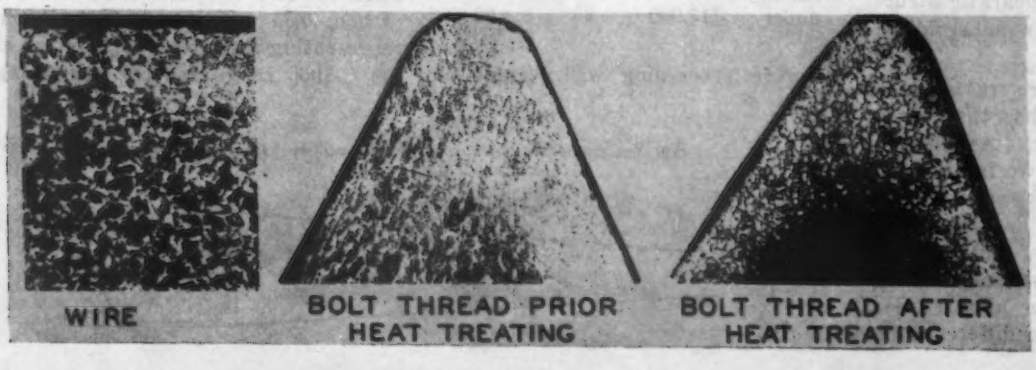

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FIG. 13 — Microphotograph showing decarburization of bolt threads. Etched in nital, at 100 X.

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TABLE III

Chemical and Austenitic Grain Size Specifications For Plain-Carbon Steel Wire

Wire Diameter, In.	Bolt Size, In.	Chemical Range, Pct			A.G.S. at 1700° F	Quenching Medium	AISI No.
		C	Mn	Si			
Over 0.430	½ to 1	0.32-0.38	0.60-0.90	0.15-0.30	5 to 8 incl.	Water	C-1035
0.430 and under	¼ to 7/16	0.37-0.44	0.60-0.90	0.15-0.30	1 to 4 incl.	Oil	C-1040

TABLE IV

Areas Used for Calculation to PSI Tensile Values

Bolt Size, In.	Area of Threaded Section	
	National Coarse (NC) Thread	National Fine (NF) Thread
¼	0.0318	0.0364
5/16	0.0525	0.0580
3/8	0.0775	0.0878
7/16	0.1063	0.1188
½	0.1419	0.1600
9/16	0.1819	0.2030
5/8	0.2260	0.2560
¾	0.3345	0.3730
7/8	0.4618	0.5095
1	0.6057	0.6798

TABLE V

Minimum Tensile Specifications for Heat-Treated Carbon Steel Bolts.

Bolt Size, In.	Coarse (NC) Thread		Fine (NF) Thread	
	Yield Strength, in Lb, Min	Tensile Strength, in Lb, Min	Yield Strength, in Lb, Min	Tensile Strength, in Lb, Min
¼	2,900	3,600	3,300	4,100
5/16	4,700	5,900	5,200	6,500
3/8	7,000	8,700	7,900	9,800
7/16	9,500	11,900	10,700	13,300
½	12,800	15,900	14,400	17,930
9/16	16,400	20,400	18,300	22,700
5/8	20,400	25,300	23,000	28,700
¾	28,400	36,100	31,700	40,300
7/8	37,400	48,000	41,300	53,000
1	49,100	63,000	55,100	70,700

The equivalent PSI yield and tensile values are shown below:

Bolt Diameter, In.	Yield Strength, PSI	Tensile Strength, PSI
¼ to 5/8 incl.	90,000	112,000
¾	85,000	108,000
7/8 to 1	81,000	104,000

complete cross-section to a hardness of 50 to 55 Rc. Actually, a complete cross-section hardness will not always be obtained. (This has been previously discussed.) The microstructure of a completely hardened and an under-hardened bolt is shown in fig. 14. The bolts are then tempered at temperatures from 900° to 1000°F depending on the hardness range required.

Tensile specifications for finished bolts are usually given as a minimum requirement for each bolt size in actual pounds and not in pounds per square inch. The reason for this is that engineers are interested in the safe loading capacity in actual pounds for each particular bolt size and type of thread. Another reason for showing bolt tensile values in pounds is that there is no general agreement as to the correct area to use in calculating to pounds per square inch. Metallurgists prefer to have the values shown in pounds per square inch as they are more familiar with this form.

Table IV gives the threaded bolt section areas having some general acceptance. This table gives areas which are calculated from the mean of the basic minor and the pitch diameter of the threaded section of the bolt. Table V gives the minimum tensile values for heat-treated carbon steel bolts in sizes from ¼ to 1 in. inclusive and for N.C. and N.F. threads.

Ed. Note:—Next week the author concludes with a discussion of alloy steel bolts.

Welding Job Prevents Steel Mill Shutdown

THE sound and economical policy of maintaining a complete welding department for normal and emergency service was strikingly illustrated recently at a large steel manufacturing plant in the Midwest which averted a 31-day production stoppage at one mill and saved over $1300 by weld repairing a single broken casting.

This maintenance project was disclosed by officials of the concern to The Lincoln Electric Co., Cleveland.

The broken casting consisted of a 6000 pound drive coupling which connected the Falk reducer and the pinion gear of a bar mill. The part, which has a 45½-in. diam., 21¼-in. length and is 5⅞-in. thick, cracked through in four places when the shear pin failed to break under an overload.

As a replacement coupling which would have cost about $1600, could not be obtained within less than five weeks, it would have meant that thousands of tons of steel would be lost to the war effort. Instead, the cast steel parts which had broken in four separate pieces, were rushed to the mill welding shop where repair work was started immediately.

Before fitting the pieces together the fractures were beveled at an angle of approximately 75° excepting ⅜-in. on the side of the coupling. The coupling was then positioned on a surface plate and the parts pulled into place by bars and bolts until a good fit-up was obtained.

Five welding operators were put to work fusing the joints from the outside. About ten passes were made on each outside seam, several sealing beads first being applied to the breaks which had been scarfed to a depth of about ¾-in. in order to reach sound metal.

The entire coupling was preheated and after each bead was applied, the weld metal was peened for stress relief.

A total of about 200 lb of weld metal was required for the job for which 5/32-in. and 3/16 in. electrodes were used of AWS specification E 6010.

After the outside welding had been completed, two operators then finished the job by applying three to four passes on the seams inside the coupling, leaving about ⅜-in. for liningup purposes. After finish welding, the work was annealed and the coupling was back in service after approximately 24 hours down time.

◆ ◆ ◆ Permeable Refractories in

. . . Large production experimental units in England, wherein the products of combustion are withdrawn through the permeable refractory lining, show considerable promise. The refractories show no tendency to clog and furnace operation appears quite reliable.

IN the Fall of last year preliminary data were presented[1] on a new technique in furnace construction, in which the products of combustion were exhausted through the walls of the furnace, these being made from a permeable material. The permeability of the materials available was such as to necessitate the assistance of either an externally applied suction or an internally generated pressure. In general, practical considerations recommended the use of suction applied by a fan or air-blast ejector.

Thus the elements of the furnace were: (1) An internal permeable wall and arch of suitable dimensions, (2) an external structure of insulating or semi-insulating material rendered as impermeable as possible by the use of internal refractory coatings and external steel sheets, care being taken to seal all joints, and (3) an annulus or space between the two to which is applied the suction, and into which the products of combustion are drawn prior to release to atmosphere.

It was shown that such a system was workable both on an experimental and practical scale, control of the furnace being in no way more difficult than that of a furnace of normal construction in which the products are vented through a flue.

It was suggested that such a furnace would possess the following advantages over orthodox designs which incorporated no form of heat salvage: (1) More rapid attainment of temperature resulting in less fuel being required for initial heating, (2) a reduced fuel consumption after equilibrium conditions had been reached, (3) a more even temperature distribution due to the avoidance of streams leading to the flue ports, and the elimination of dead spaces at corners, and (4) a greater ease of attainment of very high temperatures.

A theory was proposed which showed approximately the value of the savings to be obtained. It was admitted that this theoretical treatment was incomplete, avoiding as it did all consideration of the unsteady state, and also not taking account of possible savings due to the return to the furnace of heat from the flue gases due to their leaving the furnace at a temperature in excess of that of the walls of the furnace. The discussion then went on to describe a number of installations of permeable-lined furnaces which were actually working in industry, and to state the results obtained with them. Also, the properties of various permeable refractory materials were described. The discussions following the presentation of the data were of a controversial nature, and in a recent contribution[2] the authors make an attempt to clear up some of the points raised, before proceeding to refer to a number of furnace installations using permeable refractories.

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[1] *See* THE IRON AGE, *issue of Sept. 7, 1944.*

[2] *"Further Experience of the Use of Permeable Refractories in Furnace Construction," by R. H. Anderson, D. C. Gunn, and A. L. Roberts, Yorkshire Section of the Institute of Fuel, Sheffield. Also, Iron and Coal Trades Review, June* 15, 1945.

Among these is a large bogie-hearth furnace having an effective working bogie area of 12 ft 6 in. by 10 ft 6 in. to the crown of door arch above bogie level. The furnace is designed for a combination of both over and under-firing (through bogie) with fully floating and proportional temperature control, and furnace pressure control, to regulate the amount of suction applied for the removal of waste gases through the walls, arch and door. The bogie is of solid construction except for the ports, through which the burners fire.

Permeable block construction is used for the walls and doors backed with diatomaceous insulating bricks. The roof consists of a 9-in. permeable arch, a 3-in. annulus in all cases, and a backing arch of 9-in. hot-face insulation. Solid firebricks are used in such parts that may be subject to wear and tear, walls below bogie level, door piers and arch. Hot-face insulation is used for portions not permeable.

It was thought that with a furnace of these dimensions it might be necessary or desirable to control the amount of products withdrawn through the lining, thus facilitating the balancing of temperature distribution should this be found necessary. Therefore, each wall, the door and arch was divided into two sections as follows, front and back sections on each side wall and roof, thus giving ten separate controllable sections. All products of combustion after passing through each section are collected into a common flue, and this is in turn connected to the main waste gas offtake situated below ground level in the foundations, and so on to the waste-gas fan, each connection having a separate manually operated control damper.

Burner System

The burner system consists of a number of low-pressure velocity burners, divided into six groups, each having its own governor, reducing the gas to atmospheric pressure. There are two sets of three burners on each side of the furnace for top firing, and one set of three on one side, and a set of two on the other side for firing through the bogie. As these burners use the gas at atmospheric pressure inspirated by means of the air stream passing through the Venturi throat, it is only necessary to control the amount of air supplied for combustion. Gas control is automatic and proportional. The top four sets of burners are supplied from a common air line in which is fitted a butterfly valve to control the fuel input (the air required by the door ejectors is also supplied from this line). The bottom two sets of burners are connected to a separate air line controlled by its

Furnace Construction ◆ ◆ ◆

own butterfly. The air is supplied at 27-in. water gauge by a fan which draws it from outside the foundry through a glass silk filter.

The temperature control is of the "electro pneumatic" type. The operation of the butterfly valves in the air line is by means of air-operated lever motors, these being so arranged that the top burners have an appreciable degree of turn down before the control of the bottom burners commences, and thus the bottom burners maintain the maximum capacity as long as possible to insure adequate bottom heat to the load. The furnace pressure control consists of an instrument having a range of ± 0.1-in. wg which operates the lever motor controlling the damper in the inlet to the waste gas fan, according to the internal pressure conditions of the furnace. Both controllers are of the 24-hr circular recorder type.

The furnace was designed to meet the following requirements: (1) Annealing of miscellaneous steel castings, (2) loads of 12 to 20 tons per charge, (3) a working temperature of 1690°F; (4) a 10-hr "soak" to take place after the furnace reached control temperature, (5) the castings to cool down in the furnace before withdrawal.

TABLE I
Performance of Large Bogie-Hearth Furnace

Weight of Load, Ton	To Control		Soaking		Total Gas Per Ton, Cu Ft
	Time Hr Min	Gas Per Ton	Time Hr	Gas Per Ton	
12	3 45	3036	10	2884	5900
12	3 50	2800	10	2950	5750
14	4 30	3175	10	2405	5580
15	4 30	2820	10	2400	5287
15	4 0	2836	10	2264	5100
17	4 40	2535	10	2865	5400
19	5 0	2476	10	1844	4320
21	4 30	2150	10	1830	3980
Avgs. 15	4 20	2728	10	2435	5163

Operating data are as follows: Maximum burner capacity, 10,000 cu ft per hr, or 47.5 therms per hr minimum burner capacity (maintenance), 1500 cu ft per hr, or 7.125 therms per hr, air pressure to burners, 27 in. wg, maximum suction to annulus, 5 in. wg, average waste gas analysis pct, CO_2 11.8, O_2 0.6, CO nil.

In fig. 1 is reproduced a typical temperature graph showing: (1) Control temperature, the thermocouple being placed in the back wall 3 ft above bogie level, (2) temperature of the front section of the roof 1 ft 3 in. above load, (3) righthand side-wall 3 ft from front and 6 in. above bogie.

Working Results

There are shown also three temperature curves of test blocks 8x8x8 in., having thermocouples fixed in their centers. They were connected to a quick-reading potentiometer, and frequent readings were taken giving the curves shown. Block A was situated on the bogie at the front and raised 3 in., the block being shielded by work from direct radiation from door. Block B was situated in the center of the bogie. Graphs of pressure variation within the furnace show that the reduction of fuel input affects the top burners first, and also that the suction applied increases until the furnace attains control temperature, and then decreases almost in step with the reduction of fuel input.

Table I gives general particulars of

(CONTINUED ON PAGE 141)

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FIG. 1—Temperature readings showing the working results of the furnace.

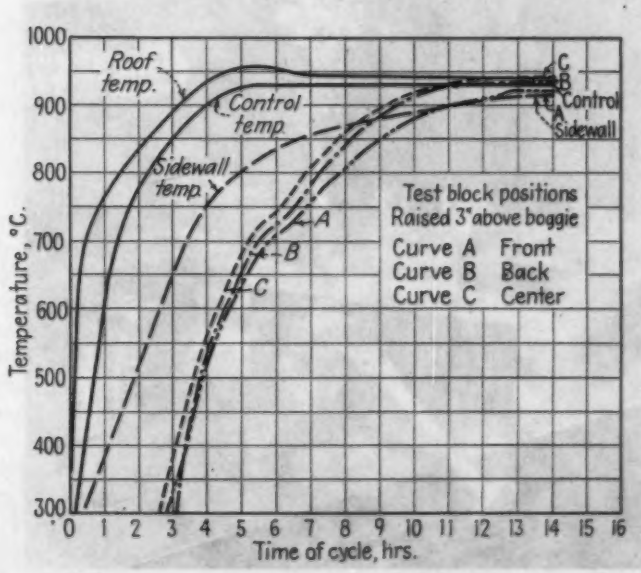
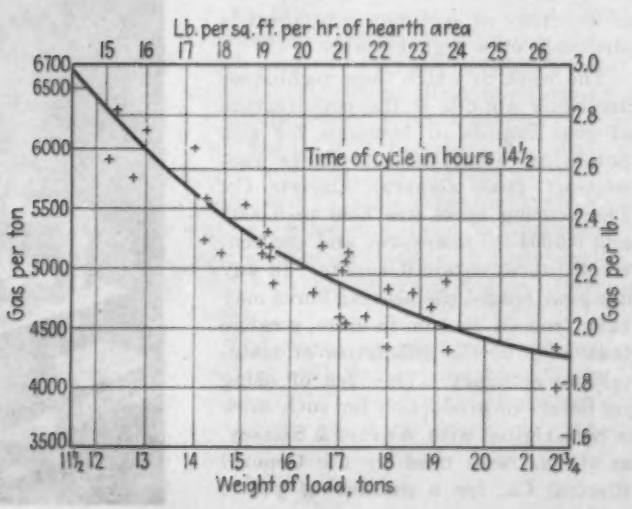


FIG. 2—Efficiency-loading curve for the permeable-refractory furnace.



Production Work On Jig Borers

By Carl Himmelright
Project Engineer, Warner & Swasey Co., Cleveland

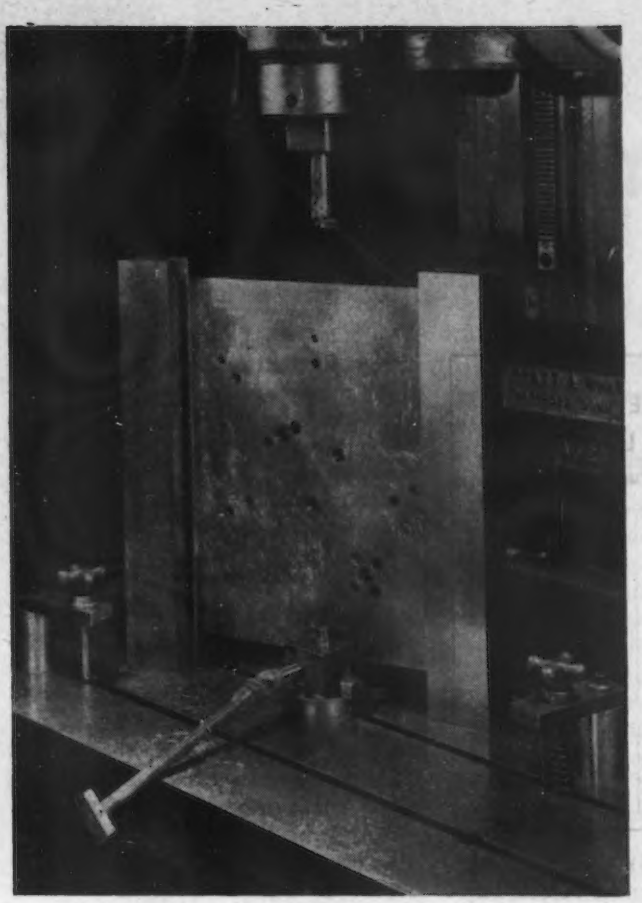


FIG. 1—Index jig plate and taper lock bolt which is entered under spindle.

WHEN fixture and gage tolerances are encountered on production work, it may be found expedient to adapt toolroom procedures to such operations. At Warner & Swasey, when confronted with such a situation, the result has been to set up jigs on jig borers, thus applying one of the first principles of mass production, namely tooling, to a machine incorporating better than normal "production accuracy" in its elements. It is generally assumed, for instance, that tool and gage tolerances are approximately one-tenth the component tolerances so that the level of accuracy of toolroom equipment is obviously on a higher plane.

The work to which these techniques are being applied is the manufacture of gear frames or housings for gun power drive mechanisms under subcontract from General Electric Co. The bearing bores are held to 0.0003 and 0.0004-in. tolerances and the center distances within 0.0005 in. In any one gear frame, the bearing bores may vary from ⅞ to 4 in. in diam, a range that adds to the difficulties of maintaining accuracy. The idea of using jig borers in production for such work is not original with Warner & Swasey, as it has been used by the General Electric Co. for a number of years. However, refinements of the boring technique have been made at Warner & Swasey.

The gear housings are made from a variety of materials, including weldments of rolled steel and castings of steel, bronze and aluminum. The rough material is normalized or put into a stress-relieved state to overcome subsequent distortion and to prevent variations that might result otherwise from relief of stresses due to machining. With the exception of the bearing bores, rough and finish machining is performed in conventional equipment. Such operations include milling of faces, drilling and spot facing of bolt holes, drilling and tapping of stud holes, and rough boring in the bearing holes.

FIG. 2—"Indicating" the tapered lock bolt to check concentricity with spindle of jib borer.

The bearing bores are finish machined on a battery of Pratt & Whitney jig borers, using the special tooling illustrated. By the use of these machines the sequence of boring operations can be accomplished very accurately through the use of index jig plates and a tapered lock pin which is centralized with the jig borer spindle. As pictured in fig. 1 the fixture has been pushed aside to expose the bottom of the jig plate and the tapered lock bolt which is mounted on the jig borer table and which is used as a hole locating arrangement. Prior to setting up any particular job, the retractable lock pin body is bolted to one of the table T slots and is roughly aligned with the spindle by manipulating the saddle and table feed screws. A dial indicator mounted on the spindle, as shown in fig. 2, is used to "indicate" around the tapered portion of the pin and the handwheels are adjusted until the indicator registers absolute zero all around, thus giving assurance that the lock bolt is exactly concentric with the spindle.

RIGHT

FIG. 4—For this type of production work, coordinate layout of the holes is done on the jig borer in the conventional manner.

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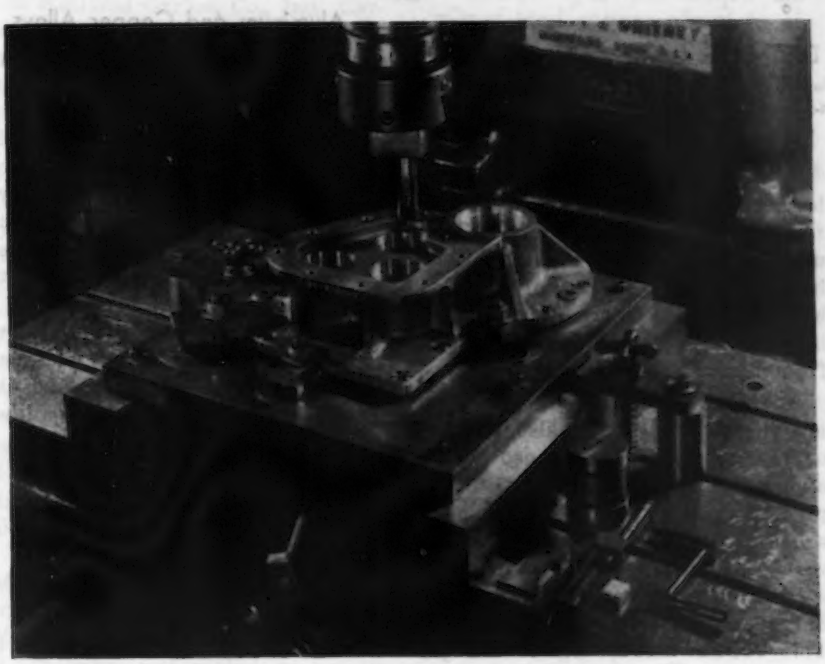
BELOW

FIG. 3—Work piece in place on index plate. The centers of the bores correspond with those of the bushing seen on the underside of the plate, fig. 1.



It will be noted that there are four tapered lock bushings in the jig plate shown in fig. 1. These correspond to the four bores in the piece shown in fig. 3 and the holes for them were laid out and bored on exact center distance within the tolerances expected on precise jig borer work. Extreme care was taken in the construction of these jig plates since any errors on center distances and coordinate layout will be reproduced in the work.

It will be noted in fig. 3 that the jig plate is mounted on two rails which straddle the lock bolt arrangement and permit the fixture assembly to be moved about readily on the jig borer table when the lock pin is in the retracted position and when the clamp bars are released. With this arrangement the jig borer table remains in a fixed position and the fixture and work are indexed from hole to hole, the position of each being established in line with the spindle by means of the lock pin and the corresponding locating bushing. Indexing is thus rapid and extremely accurate.

Fig. 4 shows an example of a jig borer being employed in the conventional manner in the same line for finish boring a cast bronze gear case. Here the holes are located by coordinate layout, using the standard end measures provided on Pratt & Whitney machines. Because of the shape of the work, it is bolted to a welded steel jig which is clamped to the machine table.

The spindle of the jig borer is revolved up to speeds of 1800 rpm. With speeds as high as this, it is necessary to balance the boring heads in order to overcome the whip that would cause an out-of-round, tapered or rough hole. To accomplish this, ordinarily one boring head is used for each size of hole to be bored and the boring tool is kept on center.

For smaller holes, offset boring cutters (fig. 4) are used and on larger holes a bar with a tool bit is used.

When the fixture is shifted from one hole to another, the boring head complete with cutter or cutter bar is replaced with a head set up for the next hole to be bored. If the holes to be bored do not vary more than ½ in. in diam, it has been found that the boring head can be adjusted without resulting in an out-of-balance condition sufficient to affect the class of work desired. When changing boring heads, it is necessary to take a trial cut and measure the trial cut hole with a dial indicator type internal measuring gage to determine the amount of stock to be removed in order to hold the final size and tolerance.

The changing of heads and machining with the jig borer spindle running at high speeds are not toolroom practices, but these steps are necessary in order to maintain output on a production basis.

Precision Founding

. . . Part VII of this series of articles on precision casting methods describes the use of nitrogen gas for refining molten metal in order to increase its fluidity during the casting step. Three types of centrifugal casting are analyzed and the mold design suitable for each is discussed.

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By FRANCIS DITTMAR
Consulting Engineer for Metal Products, Buffalo

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THE outward and the upward flow of liquid metal under centrifugal force is taken advantage of in three different ways: in the true centrifugal, in the semi-centrifugal and in the centrifuge processes. These three distinctions should be kept in mind when considering work to be cast centrifugally.

In the true centrifugal casting, two characteristics, the outward and upward flow of metal, produce a self-cored cylinder such as was mentioned in Part IV (fig. 16). The semi-centrifugal action is represented by the 3-in. ring discussed throughout this series, where metal flows down a central sprue hole and spreads through gates to the mold cavity. The gears used as an illustration of a wax pattern in Part VI are an example of the centrifuge process; the metal flows through a central sprue hole, spreads through a number of gates, each gate filling a separate mold cavity.

In all of these three phases one deals with a liquid, the fluidity of which not only depends upon its constituent elements and upon its temperature, but also upon the amount of nonmetallic inclusions. The latter must be eliminated if a really sharp metal is to be poured at comparatively low temperatures.

While the use of fluxes goes a long way toward effecting this desirable state, fluxing alone is inadequate unless accompanied by an agitation of some sort. It is a question of not merely bringing the solids of these impurities to the surface of the melt, but also gases set free during melting and gases absorbed by the metal from furnace or cupola.

In the three centrifugal processes, and in vacuum casting also, a thoroughly refined and cleaned metal allows itself to be poured at an appreciably lower heat. Furthermore, a sound refining process combined with the centrifugal action produces a metal in which impurities and gases have been reduced to a minimum. This occurs because in centrifugal casting the molecules of the impurities being lighter than those of the molten metal, are held by the centrifugal force near the axis of the spinning metal while the metal itself preempts the gates.

A refining process carried on under vigorous agitation tends to liberate gases and set them free before they enter the mold. Pinholes, porosity and rough surfaces are usually the result of gases entrapped by the cooling metal. Thus, a preliberation of gases, most commonly, hydrogen, permits a more solid mold structure, an important factor in plaster-base molds. Finally, a lower pouring temperature reduces heat shocks and shrinkages.

The higher the specific gravity of a metal, the readier does it squeeze its nonmetallic inclusions to the surface of the melt, these carrying some of the gases with them. For instance, in iron this squeezing already begins in the cupola, in nonferrous metals in the crucible. The latter group of alloys will be dealt with first.

Aluminum and Copper Alloys

Due to its comparatively low specific gravity aluminum holds its impurities and gas content most tenaciously. When charging the crucible each separate piece of ingot or scrap metal should be sprinkled with a layer of flux so that each piece may be protected at the very start of the heat by a coating of the melting flux. When the metal has run down enough, a cover is placed on the crucible to prevent the absorption of additional gases and other impurities, and also to keep the metal itself under a layer of flux.

An identical procedure should be followed in melting copper alloys. In both instances a thorough stirring or agitation induced by some means is necessary in order to realize the full effect of the flux.

This agitation may be effected by simply stirring the alloy with a rod, preferably of graphite, or by another method which is much more productive of results, namely, by an infusion of nitrogen gas. In the case of aluminum, should stirring be deemed satisfactory, the cover is removed when the metal is nearly ripe and the inside of the crucible is scraped and its spout freed from oxide. It is then stirred again and the dross allowed to remain atop the melt until 1400° F is reached. Then the dross is carefully skimmed off with a graphite rod and the melt poured.

Nitrogen Gas Method

A more efficient agitation—and consequently a far better metal—is obtained by forcing nitrogen gas into the metal via graphite tubes, the resulting boiling action causing the hy-

drogen gas bubbles to attach themselves to nonmetallic bodies which, actuated by the boiling, rise to the surface of the melt. Equally so, the naturally buoyant hydrogen gas, set in motion by the boiling, will rise under its own power.

More than a single tube should be used in this process since the pressure behind the nitrogen gas is insufficient to overcome the resistance of the molten metal, this resistance resulting in the nitrogen gas bubbles rising near the tube while the surrounding metal in the crucible remains undisturbed. Three tubes set at a slight angle such as shown in fig. 27 would produce a more effective result.

Graphite stirring rods and tubes are quite inexpensive and may be obtained from foundry supply houses or from National Carbon Co., Inc., Carbon Products Div., P. O. Box 6087, Cleveland 1, Ohio.

Since nitrogen gas blown through molten metal must be absolutely dry, it should be filtered through some moisture absorbent substance such as silica gel, obtainable at chemical supply houses. Silica gel comes in a coarse-grained, pebble-like form and is, while dry, of a whitish color. The material turns blue when saturated with moisture and in order to observe this change from white to blue, the silica gel is usually contained in a glass filter. This container may be made on the premises. It is simply an 8 to 10-in. long piece of steam-gage glass of 4-in. diam. held in a suitable frame or cage (see fig. 28). It should be kept clean so that the operator can at all times tell with certainty by the color change in the silica gel just how much is left of its moisture absorbing property. The nitrogen gas flowing upward through the filter will turn the bottom layers blue first, then that color will mount with succeeding heats until the entire mass has been exhausted of its moisture absorbing power. Whereupon the charge should be renewed. Drums containing silica gel must be kept absolutely airtight by sealing their cover joint with a strip of plasticine.

Attention to the filter prevents serious accidents.

When using the nitrogen gas process the aluminum is allowed to reach very nearly 1400° F before the oxide is scraped and the dross removed during boiling. Graphite rods only should be used.

Practically the same process is used for copper alloys. The refining

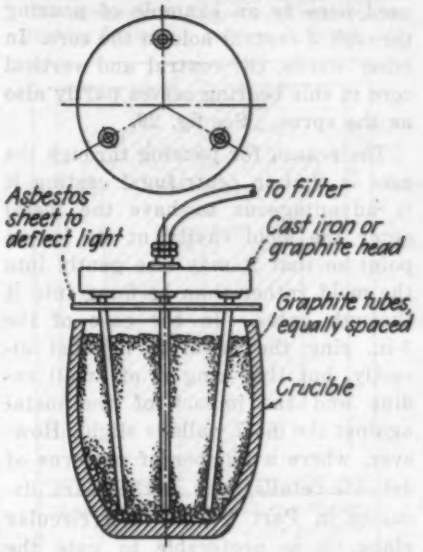


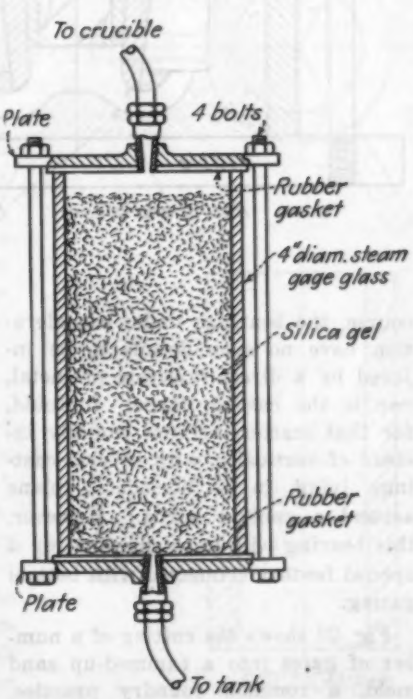
FIG. 27—Method of infusing nitrogen gas into molten aluminum (and copper alloys) to effect a boiling action and thus allow hydrogen bubbles to rise.

greatly increases the fluidity of both metals, to say nothing of the denser metal obtained in the castings. The cleaning, that is, the skimming, should continue during the entire pouring.

Cast Iron Refining

In laboratories where there is only a small cupolette, one easily relined

FIG. 28—Silica gel holder for removing moisture from nitrogen gas.



at no great cost, and having no cumbersome apparatus like a teapot type refining ladle, cast iron may be refined by placing at the bottom of the charge a thin-walled steel cylinder packed with aluminum shavings. Both ends of the cylinder are closed with a disk of sheet metal and made airtight with clay. As the iron melts the thin cylinder burns through and aluminum is ignited, causing a boiling action up through the iron. Soda ash added to the melt in the cupola combines with the rising slag. Further refining may take place in the manner described below.

In production, the metal is run from the cupola into a teapot refining ladle. Aluminum shot is added to the stream at the rate of 1 lb per ton of metal, and along with the aluminum calcium silicide is added in the proportion of ½ lb per ton of metal. The rising slag is thickened with silica sand and raked off.

From the refining ladle, a little of the iron is poured into a large ladle and into this soda ash is stirred. The ladle is filled gradually with additions of soda ash. Again silica sand is used for thickening and the rising slag raked off. Then the refined iron is transferred into pouring ladles. (This secondary refining process would, in a laboratory, take place as the metal leaves the cupolette.) Whatever loss of heat in incurred is made up in part by the addition of soda ash which raises the heat from 50° to 100° F, and in part by casting centrifugally.

Battery of Cupolettes

Because this type of casting is, in the main, a continuous process, a battery of half-ton cupolettes is often preferable to a single large-sized cupola. The refining ladle and the casting machines travel on tracks in front of the battery of cupolettes and when the first one is empty the equipment is moved to the next which by that time should be ripe, and so on until the end of the line whereupon the first cupolette, relined, charged and fired will be ready for pouring off again. Such an arrangement affords an uninterrupted flow of metal.

Where the size and quantity of castings warrant and in particular, when pouring in large-sized stack molds without the use of flasks, the casting machines should be set in pits both for the sake of easily controllable pouring and, incidentally, for the protection against mishaps. This feature will be described in detail in

Part VIII when discussing steel castings, the main purpose of the present discussion being a presentation of some methods of making medium size iron castings via the three phases of centrifugal casting.

There still remains that 3-in. ring to be accounted for in yellow brass. As in all nonferrous practice the alloy should be run down under a high initial heat so as to cause the layers of flux to melt with the greatest rapidity. The fluidity of any copper alloy may be increased by an addition of 15 pct phosphor bronze after the metal has been refined and skimmed, stirring this phosphor bronze well into the mix just prior to pouring. For more detailed data on this subject and also regarding the use of fluxes see brochures published by the American-British Chemical Supplies, Inc., 180 Madison Avenue, New York.

The following examples in cast iron are these where density and strength of metal and not precision of measurements are the chief considerations. These four examples present in their differing requirements various aspects of centrifugal casting, some features interwoven one with another, others distinctly separate. The first is that of a bearing where softness and resistance to wear is important; the second, that of a cylinder designed to hold oil under high pressures; the third, pot-castings for piston rings, and the fourth, the casting of large diameter work, in this case a ring.

Cast Iron Bearings

Iron centrifugally cast has long been known to be an excellent material for spindle bearings on high grade machine tools. It combines softness with density of grain and great resistance to wear. Hence, where quality of metal is of first concern, the centrifugal process has an advantage even if the number of castings to be made is relatively small. For the quality delivered by this process would be hard to duplicate in any other way.

While such bearings may be cast in plaster-base molds, owing to the refining of the iron and its consequent lower pouring temperature, however, a dry sand mold would do as well, if indeed not better, since neither surface finish nor details enter into consideration. Another reason, in this instance, for using sand rather than a plaster-base mold is that the coring of this bearing is used here as an example of pouring through a central hole in the core. In other words, the central and vertical core in this bearing serves partly also as the sprue. See fig. 29.

The reason for pouring through the core is that in centrifugal casting it is advantageous to have the metal enter the mold cavity at its lowest point so that it may rise gently into the mold rather than be flung into it through gates. In the case of the 3-in. ring the metal is injected directly, but that ring is of small radius and the impact of the metal against the mold walls is slight. However, where a number of patterns of delicate details, such as the gears discussed in Part VI, lie in a circular plane, it is preferable to gate the castings at their bottoms; thus checking the impact of the metal. Of course, the bearings under consideration have no such details to be injured by a direct injection of metal, nor is the casting large. It could, for that matter, be cast radially instead of vertically, with several castings lying in a horizontal plane around a central sprue. However, this bearing will do in illuminating a special feature connected with bottom gating.

Fig. 29 shows the cutting of a number of gates into a rammed-up sand mold, a common foundry practice. The core is rammed up around a central arbor of either wood or metal. The pattern is rammed up in frames which correspond with the length, width and height of the inside dimensions of the flask. The flask here is square, but there is no reason why flasks of any shape cannot be spun so long as they are well balanced. After the pattern is removed from the frames the impression left by the pilot projection on the core prints in plugged with sand, see fig. 30, and the gates, shown in fig. 29, are cut from the inside of the core print to the bottom of the cylindrical imprint left by the pattern.

Pouring Funnel

The tapered hole through the core not only permits an easy withdrawal of the core arbor but also allows the pouring funnel to be inserted to some depth. As will be explained later, a pouring funnel spout is grooved in order to impart to the down-rushing metal an initial whirling motion so that when the metal strikes the bottom of the sprue hole there is less inertia to overcome, less grinding of metal against sprue hole walls and bottom. This greatly reduces the danger of any mold particles breaking loose which might be washed into the gates; whatever abrasions may

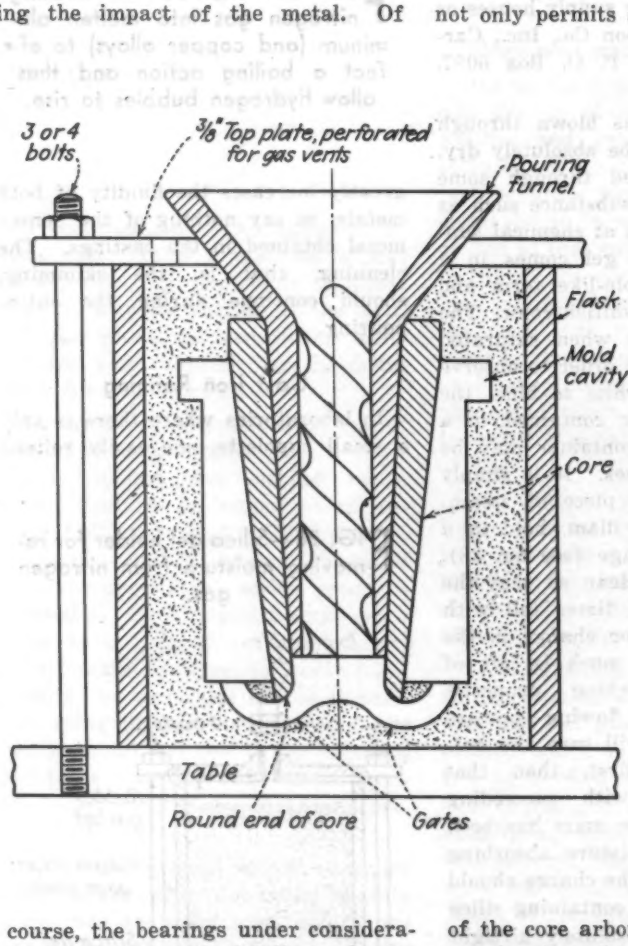


FIG. 29 — Centrifugal casting of iron bearing in which the central and vertical core serves partly as a sprue.

occur would already be held near the center of the vortex generated in the funnel. Hence, the longer the spout, the more powerful is the vortex set up, and the deeper that spout is in the sprue hole the less forceful is the metal's impact, since the grooves also tend to check the speed of the down-rushing metal.

The frames in which the pattern is rammed up should be slightly oversize. The molds are baked in their frames and after removal from the frames have their corners shaved off so that the two assembled halves, with the core in its place, may the more readily allow the flask to be pushed down upon them. The mold, being slightly larger than the flask, has its surplus sand shaved off as the flask is pushed down over it. The flasks may be made of straight and square boiler plate welded together. A square nest should be provided on the spinning table into which the flask fits with fair accuracy. The top plate of either 5/16 in. or ⅜ in. thick boiler plate, well perforated to permit rising gases to escape, may be either round or square and is held down by three or four bolts. Ample spinning speed is 250 to 300 rpm. Before pouring, the flask should be tested for balance. When making the frames or mold boxes for such castings, the locating points or pilot pins on the pattern should be in the exact center of the frame. If the mold cavity is off center vibration will occur during pouring, which will almost certainly ruin the casting.

Owing to the water-moistened cereal binder in dry sand molds the baking ought to start rather slowly and the initial heat should not exceed 200° F in order to prevent the generation of steam and cause fissures. When all the water has been driven off, as certified by the mirror test, the baking temperature may be raised rapidly to 500° to 600° F. There need be no gradual reduction of heat such as is necessary in plaster-base molds. Dry sand molds, however, deliver a better casting when they are hot, or at least warm enough, to necessitate the use of gloves in handling. Hot molds assist the flow of metal.

Pressure Cylinder

Shown in fig. 31 is a casting 8 in. long with a 2¾ in. ID and 4 in. OD. The cylinder wall thus has a cross-section of ⅝ in. The three lugs are cored. Originally cast in gray iron with 1-in. wall, it was found that the oil in time penetrated the metal, causing it to crack and the lugs to break off. Since forgings would have been too expensive and of problematic value, owing to the distortion of the grain resulting from hammering, it was decided to cast this piece centrifugally, and to cast it in iron rather than in steel in order to save time in the machining later.

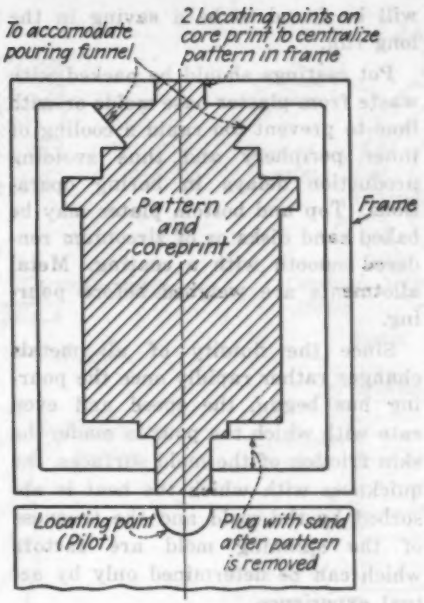
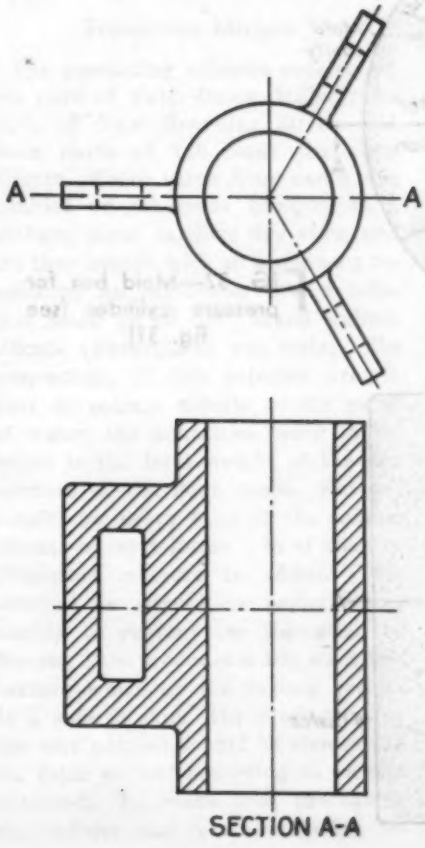


FIG. 30—After the pattern is removed from the frames, the impression left by the pilot projection of the core print is plugged with sand.

FIG. 31—Sketch of centrifugally cast gray iron pressure cylinder.



From a manufacturing standpoint, centrifugally cast iron offered these advantages. First of all, this process would deliver an exceptionally dense material of sufficient strength to withstand pressures of 2000 psi and over. (After six months of constant use the cylinders showed no oil penetration.) Secondly, a smooth-skinned, reasonably round and straight-walled cylinder would allow itself to be chucked true at one setting and thus cut down the time required for the facing, boring and thread cutting operations. There was also lighter weight of the piece. A plaster-base mold was decided upon since in such a mold the lugs would readily leave their own cores; 3/16 in. was allowed for finish in the central cored hole.

These castings were made without the use of cradles. The mold boxes were made of aluminum. (Wood would have swelled and warped because of the wet investment.) See fig. 32. The lug cores were effected by right and left-hand sections which, it will be noted, are at an angle of 70° instead of the 60° which would have given them straight sides. A 10° clearance was necessary on each side of the center sections so that these would release readily from their boxes. By way of gates, four holes were cut into the core near its bottom; the core was made around a wax arbor stopped about 1 in. from one end of the core.

Pot Castings

When cast centrifugally, piston rings increase an impact resistance and in their modulus of elasticity. When cast in the true centrifugal phase, as single, self-coring cylinders, the cross-sectional thickness of wall should not exceed ⅞ in. The height to which the metal will rise under centrifugal force is a little better than twice the outside diameter of the casting. A cylinder having an OD of 6 in. would rise to a height of about 13 in.; its maximum wall thickness would be around ⅝ in., the metal spinning at 750 rpm.

Spinning speeds vary anywhere from 200 to 1000 rpm, depending upon the diameter of the casting. The centrifugal force, 50-75 times gravity in the true centrifugal phase, throws the first and coldest metal to the periphery of the mold and the required speeds are determined by actual try-outs. There are, however, some established facts that can be used as a guide. For instance, to

pour centrifugal work with too thick a wall will result in cracks. The remedy is obvious: cut down the wall thickness. If that cannot be done the job is not a true centrifugal one and must be cored. Hot tears develop from too high a spinning speed. Also deep longitudinal cracks develop when the mold under heat and pressure becomes oval or is otherwise distorted; that is, thrown off balance. This can be overcome by pouring at a lower temperature. Cracks may also be caused by vibration during the cooling period of the metal. In such a case the casting machine may be too light in construction, its table too light or too large or the bearings may be worn.

In order that flaws of mechanical origin may be avoided, casting machines should be massively constructed, run smoothly and without vibration. The tables should be removable so that they may suit the particular diameter of the job at hand and not extend, as they often do, a foot or more beyond their effective range. To have on hand several tables of different diameters to accommodate flasks of various sizes will be found to be a saving in the long run.

Pot castings should be packed with waste from plaster-base molds or with lime to prevent too rapid a cooling of inner periphery and thus avoiding production delays in boring operations. Top and bottom plates may be baked sand disks or of zirconium rendered smooth with a coating. Metal allotments are weighed before pouring.

Since the fluidity of all metals changes rather rapidly once the pouring has begun, the speed and even rate with which the pour is made, the skin friction of the mold surfaces, the quickness with which the heat is absorbed by the mold and the trueness of the spinning mold are factors which can be determined only by actual experience.

Circular Castings

Circular castings may be done in either of two ways: via the semi-centrifugal method—that is, through a central sprue from which gates radiate to the casting's inner periphery, or by means of a large central core such as was mentioned in Part I. Smaller diameter castings may be made by the centrifuge process. Fig. 33 illustrates the semi-centrifugal method and fig. 34 the centrifuge method. In both cases the molds are of the dry sand variety and are not encased in flasks but have, as will be observed in the sketches, on the outside of their peripheries three half-round equally spaced notches, these engaging three steel bars set into the spinningtable. The tiers of the molds are held down by a heavy plate fitted closely over these bars; the plate itself perforated to allow rising gases to escape. While only six molds are shown in fig. 33, there may be as many as are practicable, a dozen perhaps, or even more. The molds are baked separately in the flasks in which they are rammed up and between perforated steel plates of ¼ in. or 5/16 in. thickness to prevent warping.

As will be seen in fig. 33 the gating does not run directly from the central sprue to the inner periphery of the casting. If this were so the gates would then be too long and metal might chill. In addition, the impact against the mold walls, due to the long distance the metal travels in the gates, would be too great and would cause distortion. Because of this the metal, on leaving the sprue, enters first a gate on a lower plane, fills and rises in a riser or feeder and from this riser or feeder enters a secondary gate which fills the mold.

It will be observed that these secondary gates as shown in the plan view are curved and are heavier (bigger) than are the primary ones. They are curved in the direction of the rotation of the table so as to act as a check on the inrushing metal and thus lessen the impact against the mold walls. This shock will be severe owing to the large diameter (and they are greater in volume than the primary gates in order to provide feeding material during the time that the casting is cooling and shrinking). In the design presented in fig. 33 three such risers or feeders are shown; more may be used if necessary.

Zirconium Silicate

The 3 in. ring to be cast in iron will serve as an example of the use of zirconium silicate even if under actual production of iron castings the rings could be cast in molds less expensive and simpler to make. Since the matter of pouring funnels should be discussed at this stage, and since zirconium silicate is an excellent material for such purposes owing to its

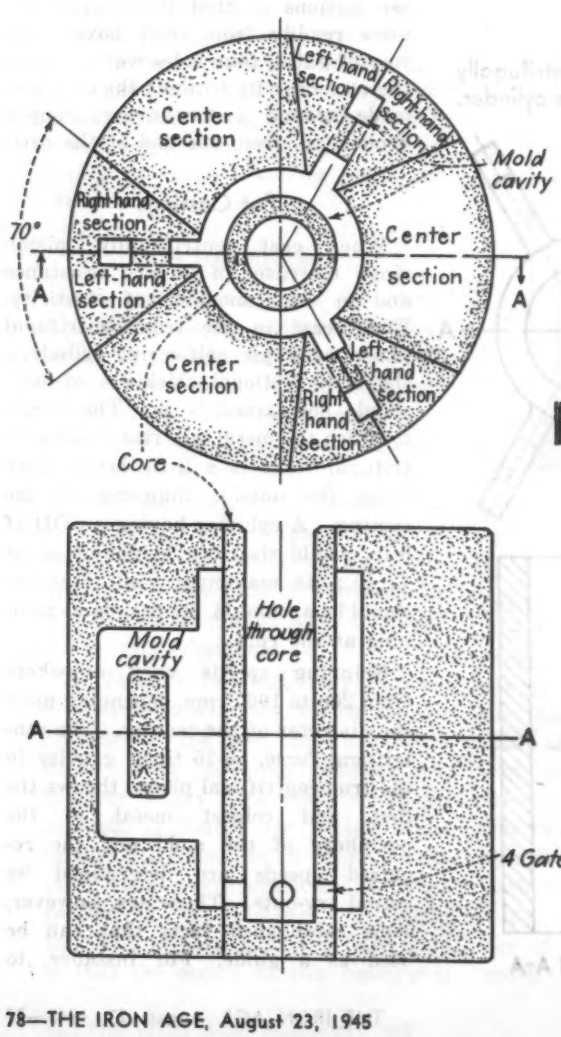


FIG. 32—Mold box for pressure cylinder (see fig. 31)

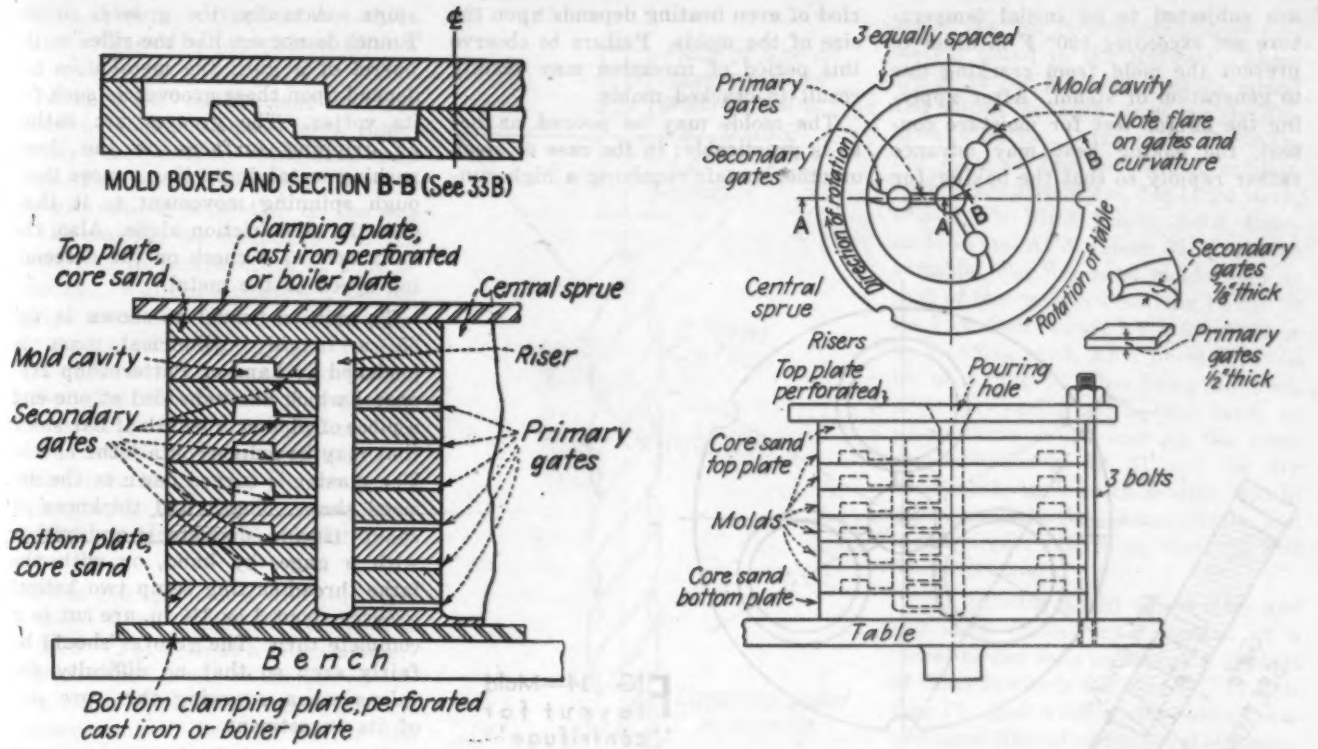


FIG. 33—A (left) Design of dry sand stack molds for utilizing "semi-centrifugal" method. B (right) Metal enters primary gates and from riser enters secondard gates filling the mold.

strength and capacity to withstand high heats, this material will be considered from a standpoint of making molds. Whether these molds are for iron or for steel castings or simply for making pouring funnels is of no consequence. For in its fired, not baked, state zirconium silicate resembles unglazed crockery (bisque ware) more than it does a sand mold, a feature resulting in some difficulties at the shake-out owing to its hardness. However, in small iron or steel castings—in stellite or in beryllium also where metal has to run under high heats and patterns are of intricate design and high accuracy that the lost-wax process has to be resorted to, the use of zirconium silicate delivers satisfactory results despite its drawbacks.

Zirconium silicate is found as a sand on the beaches in Florida and in California and elsewhere in the Caribbean, which upon being milled to various mesh flours is put on the market under different trade names. The particular one here discussed is put out by the Titanium Mfg. Co. of Niagara Falls, New York, as Tam Air-Setting Cement No. 34293-A.

As an example of its application the 3 in. ring would first be dipped in a 0.5 pct solution of Aerosol, with a swirling motion to prevent blank spots forming on the wax pattern, and then dipped into a wet precoating. (All proportions herein given regarding these specific materials are by weight only.)

Precoating Mixture

The precoating mixture consists of one part of Tam Zircon Milled, two parts of Tam Granular Zircon and three parts of 140 mesh zirconium silicate. These three flour sands are tumbled or otherwise brought to a uniform blend in their dry state and are then beaten with an apparatus resembling an egg-beater into a solution made up of "N" brand sodium silicate (waterglass) and water. The proportions of this solution are ½ part of sodium silicate to 0.6 parts of water, the quantities being in relation to the total weight of the dry mixture of the flour sands. For example, for every 9 oz of the sodium silicate-water solution 1 lb of the dry flour-sand mixture is added. This mixture is stirred or beaten thoroughly to prevent the formation of lumps. This produces a slip of a fine texture which on the casting results in a smooth skin. The precoating on the wax pattern should be about 1/33 in. thick or less according to results obtained. To make that precoating any heavier may result in cracks; besides, the less there is of it in the mold the quicker will the gases escape.

While the coating is still wet, it is sprinkled with a 60-mesh silica sand in order to afford the investment proper a sound grip on the otherwise smooth coating.

The investment itself consist of one part of the Zircon Cement No. 34293-A, one part of 60 mesh, one part of 140 mesh and one part of 250 mesh silica; these four parts are tumbled or otherwise brought into a uniform blend. One hundred parts of this blend is then sifted into 14 to 16 parts of water to which has been added ¼ part, by weight of the dry blend, of a wetting agent, Tam Modifier 29235-B. The resulting mixture should be beaten for 1 or 2 min to drive the air out whereupon it is ready for pouring. It will be found to have the consistency of a heavy cream. In pouring care should be taken not to wash the 60 mesh grains off the precoating.

The investment will set in 14 to 15 min and after about 5 min a venting pattern should be introduced; the No. 14 gage wires may come as close as 3/16 in. from the inner and outer peripheries of the wax pattern.

After setting, the molds must be set aside for about 1 hr to gain their maximum strength after which they

are subjected to an initial temperature not exceeding 190° F in order to prevent the mold from cracking due to generation of steam. After applying the mirror test for moisture content, the baking heat may advance rather rapidly so that the baking (or firing) time is accomplished in a few hours. The average time for the firing is a little less than 1 hr per in. of cross-section; a 7-in. thick mold would be fired in 6 hr. The molds for this 3 in. ring, being about 2¼ in. deep, would take about 2 hr of firing.

Due to the high heat, from 1600° to 1800° F, the expansion of the flask will have to be taken into account. As will perhaps be remembered, these flasks were cut from steel tubing. They should be normalized at as high a temperature as that required for the firing of the investment. Further, to make sure that no play develops between investment and flask, they ought to be studded inside with short plugs so that the investment has a firm grip.

Zirconium silicate first expands under heat and then contracts as that heat rises past 1067° F, a characteristic known "crystalline inversion." Consequently molds must be kept at about 1070° F for 15 min to 20 min before applying the final heat; the period of even heating depends upon the size of the molds. Failure to observe this period of inversion may readily result in cracked molds.

The molds may be poured as hot as is practicable; in the case of steel, or other metals requiring a high running heat, this is practically at white heat. When using this material quite a few trial castings will have to be made before arriving at final conclusions regarding pattern sizes and, as already pointed out, there may be some difficulty in getting the castings out of the hard mold. This drawback can be overcome to some extent by the use of hinged flasks which open after pouring. To dump these hot molds into water and so crack them may cause damage to the castings inside them.

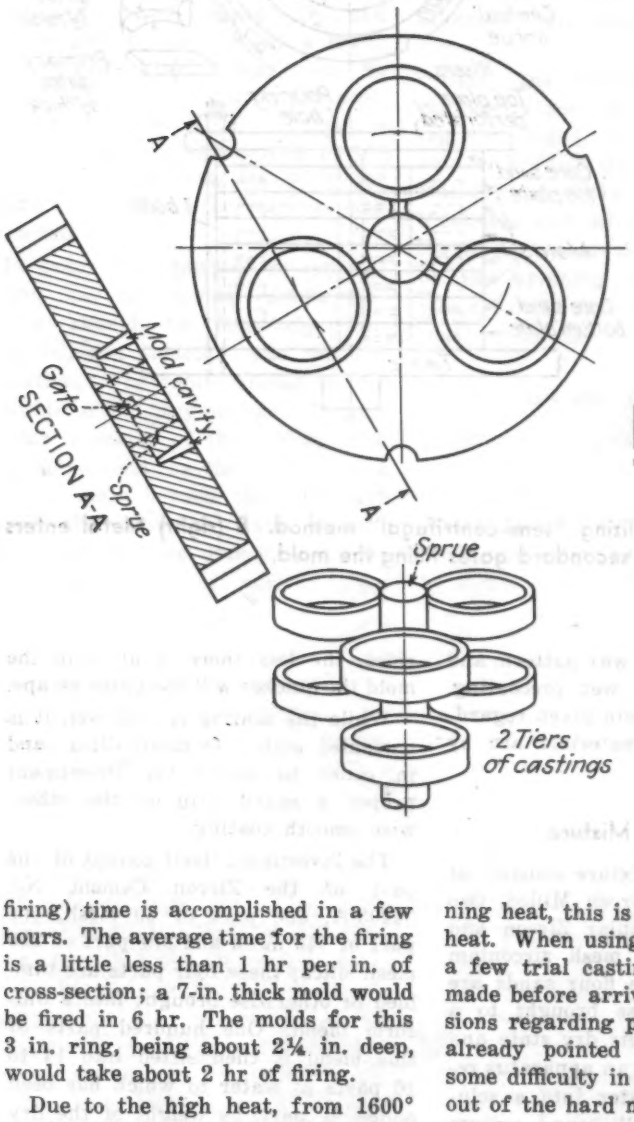


FIG. 34—Mold layout for "centrifuge" method.

Pouring Funnels

A pouring funnel should be grooved in order to impart to the descending metal its initial whirling movement. Centrifugally cast metal may be poured at its lowest flowing temperature and once the flow has begun even a second of time is important. Since the funnel turns with the mold, the direction of the grooves must be the same as the direction in which the table spins. Actually, the grooves in the funnel do not act like the rifles in the barrel of a gun; the metal does not depend upon these grooves as such for its vortex. The grooves act rather as gripping surfaces on the down rushing metal, imparting a more thorough spinning movement to it than does the skin friction alone. Also, the helix acts as a check on the descending speed of the metal.

To make a funnel as shown in fig. 35, a roughly cylindrical mass is modelled by hand of Patternshop Hydrocal which has imbedded at one end a piece of pipe or a length of bar stock that may be gripped in a lathe chuck. The plaster is turned down to the desired shape, length and thickness of spout (inside diameter) and either with a gage, by hand, or with the lathe thread-cutting setup two helical grooves about 3 or 3½ in. are cut to a complete turn. The grooves should be fairly even so that no difficulty develops when screwing this core out of its investment.

This core is shellacked and encased in a sheet of clay or plasticine, in the same manner that a gluemold is made, of the same thickness of the funnel. If the clay is not exactly round and smooth the piece is placed in a lathe and turned smooth with a flat-nosed tool. One of wood would do. After that a mantle is built in two halves around the core with its clay covering, using the reduced spout-end, left blank (see fig. 35) as one locating point. The basin part of the core is centered with two pieces of clay or plasticine. Then a batch of zirconium silicate is made and poured in carefully so as to avoid the formation of air-pockets. The cast is allowed to set for 1 hr before the core is removed. To facilitate that removal, two holes are drilled into the basin part, two pins are inserted and gently the core is unscrewed with a bar. After the core has been removed, the mantle is opened. For the funnel, the same process as for the molds for the 3 in. ring is used. It is baked slowly at first, then fired for about 1 hr, the funnel being a thin-walled job.

Pouring funnels should be treated with care; broken or even chipped spout nozzles seriously impair their value.

As has been remarked earlier, the 3 in. ring in cast iron would not warrant so expensive a mold as one of zirconium silicate. But on a production basis the ring would be cast in a flour-sand, asbestos and plaster mold of 30 parts sand or Silex, 20 parts Mouldene and 50 parts plaster for a

tryout. The proportions of the three ingredients can be determined after a run of trial castings.

Plaster-base molds need not be either a Mouldene-plaster or a Silex-plaster composition; Mouldene and Silex may be used together in varying proportions depending on the size of the casting, the composition of the metal and its temperature at time of pouring. While a drawn out baking period above 750° F injures the plaster content of such a mold, it may nevertheless be subjected to nearly three times that heat so long as that heat is of brief duration and so long as the metal lying against the mold walls cools before the plaster crumbles. Plaster disintegrates completely at 2400° F but does not disintegrate instantly.

Since the ring has a wall thickness of only ¼ in. a refined iron poured at 2250° F, or even at a lower temperature, cannot, owing to its lack of volume, cause appreciable damage to the plaster content because before the plaster has turned to dust in sufficient depth, the metal will have set. The asbestos fibers, mixed uniformly with the silex or flour-sand, strengthen the mold in this respect, being less dependent for its cohesion upon the plaster binder.

From this example alone it should be apparent that a well-refined metal, pourable at a reasonable heat, together with a thoroughly blended mold material baked at a temperature which does not weaken its structure is of the utmost importance.

Investing the Ring

Should parts similar to this ring cast in either nonferrous alloys or in iron or steel show distortions after varying mold compositions have been tried, the investments should be poured into cradles in order to support the mold walls. Such cradles made from zirconium silicate, without any precoating as the funnel was made, would with ordinary care last a long time. Zirconium silicate cradles are of an open, porous, structure and are as hard as brick. The inside walls of cradles should receive a thin, light spray of hot stearin wax in order to prevent the plaster from being "killed" by too rapid water absorption. The accumulated residue of the wax, after the cradles have been used repeatedly, may be burned out as the zirconium silicate can withstand high temperatures.

The investment process of the 3 in. ring in a Silex-Mouldene-plaster mold is identical with that of the Mouldene-plaster mold discussed earlier when the ring was cast in yellow brass.

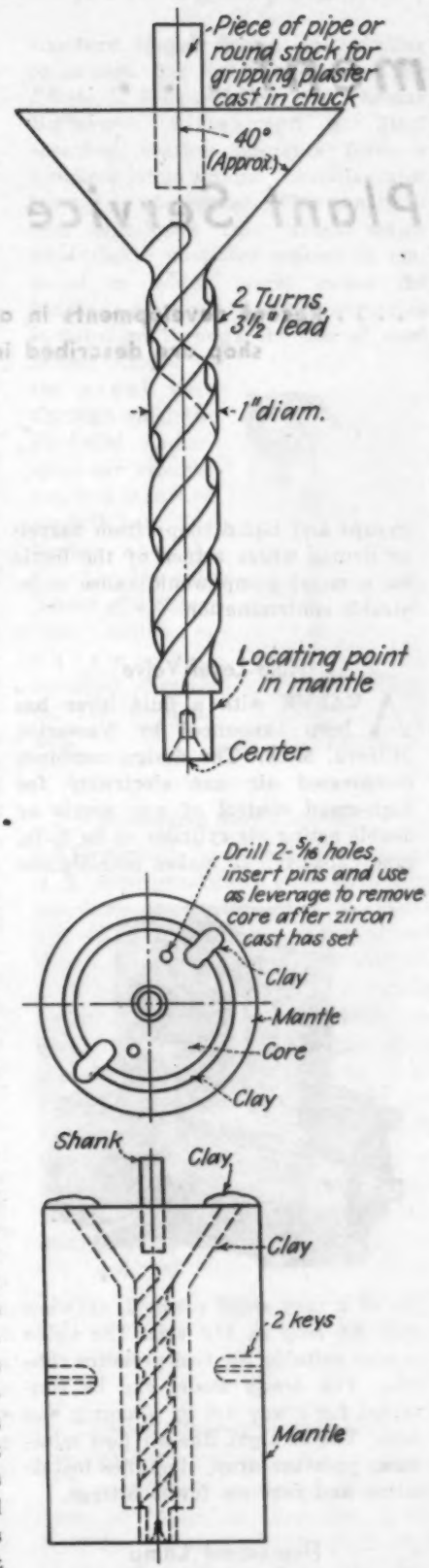


FIG. 35—A (top) Pattern for pouring-funnel core. B (bottom) Mold for pouring-funnel.

The sands especially adaptable here are of the "St. Peter's sandstone" formation found in the Midwest. These are 99.89 pct pure silica sands mined and milled by such firms as the Ottawa Silica Co., Ottawa, Ill. For making more or less permanent cradles, open grain structures, for large work, this firm's Flint Silica, AFA finest 30.5 or its AFA finest 35 would be suitable. For dry sand molds such as that of the cast iron bearing in fig. 29 its Fine Bond sand, AFA finest 60 or its Banding sand, AFA finest 95 could be used, the 95 also being adapted, after tempering with flour-sand, to plaster-base molds such as the pressure cylinder in fig. 31, and for dry sand molds such as those discussed in relation with the piston rings and large circular castings, figs. 32 and 33, respectively.

The bonding agent for cradles and dry sand molds are composed of a cereal binder such as Mogul, a product of Corn Products Refining Co., 17 Battery Pl., New York, and a core oil consisting of linseed and mineral oils and a resin. After ramming up and before baking, the molds are sprayed with a composition of fine grain refractory materials held in a water suspension so that the casting skin may be smoother than that of the more open structure of the mold itself, in other words it is a precoating applied on the mold instead of on the pattern. Cradles, naturally, are left as porous as their sands permit.

In the bearing of fig. 29 and in the circular castings of figs. 32 and 33, the mixture for the molds would be one fifth, by volume, of AFA finest 60 to four fifths of AFA finest 95; and to one 100 lb of this mixture 1¾ qt of Mogul and to 0.6 qt of core oil are added.

The mold spray is made up of Bentonite (a colloidal clay of volcanic origin found in the Black Hills), flour-sand, glutrin (a wheat derivative having the opposite effect to that of Aerosol on water) and water in the following proportions:

Into a gallon of water 1 qt of Bentonite paste and about 0.1 qt of glutrin are dissolved. To this 4 lb of silica flour is added. The Bentonite paste is made of one part of Bentonite by measure to two parts of water at about 180° F. The purpose of this spray, besides delivering a smooth finish, is also that of causing a slower cooling of the casting.

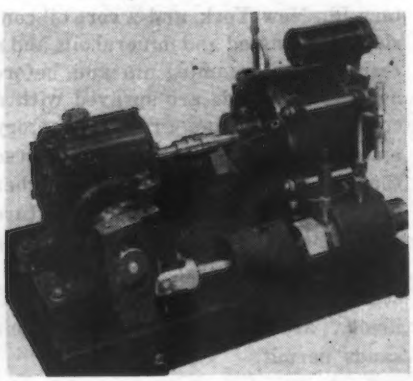
(In the next part of this series of articles, to appear in a future issue, the author describes the techniques of cored work.)

New Equipment . . .

Plant Service

. . . . Recent developments in accessories for the metal working shop are described in the following pages.

THE "Precision" U.O.P. duplex high pressure pump with variable stroke has been announced by *Precision Scientific Co.*, 1750 N. Springfield Avenue, Chicago 47. The pump is of the duplex type with individual cylinders, permitting two different types of liquids to be pumped at the same time, or where increased volume is desired above the capacity of a single cylinder, both cylinders can be piped in parallel. The design of the pump permits continuous operation and it will maintain a given flow rate continuously, delivering full rated output at maximum rated pressure. Volumetric efficiency throughout the range is said to be over 90 pct.

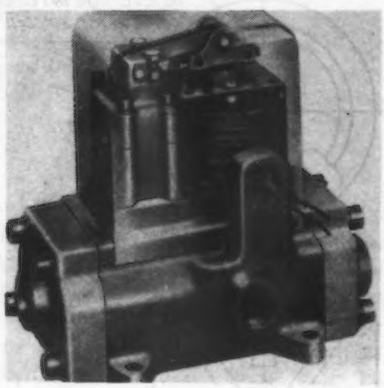


Suction Pump

A HAND-OPERATED suction pump built of an inert plastic has been announced by *Alden Speare's Sons Co.*, Cambridge, Mass. Designed primarily for the safe handling of acid, it attaches to acid carboys of from 5 to 13 gal. It is said to withstand immersion in practically all grades and kinds of commercial acids. As it is unaffected by alcohols, oils or water, it may also be used for transferring liquids such as bulk perfumes, essences, flavoring extracts, syrups and liquid soaps from barrels or drums where attack of the liquid on a metal pump would cause undesirable contamination.

Fluid Lever Valve

A VALVE with a fluid lever has been announced by *Numatics*, Milford, Mich. The design combines compressed air and electricity for high-speed control of any single or double acting air cylinder up to ¾-in. pipe capacity. It makes possible the use of a very small solenoid, drawing only 3.6 amp at 110 volt. The valve is also suitable for two pressure control. The 4-way model can be converted for 3-way use by plugging one port. The straight line air flow minimizes pressure drop, simplifies installation and requires fewer fittings.



Fluorescent Lamp

AN instant start 40-watt, T-12 fluorescent lamp specially designed to operate with instant starting type of ballast and specially treated to eliminate operating faults frequently encountered in conditions of high humidity has been announced by *Sylvania Electric Products, Inc.*, Salem, Mass. The lamps are designed to operate in two-lamp compensated ballast circuit providing 450-volt operation without affecting light output, life or other features of the standard 40-watt fluorescent lamps. The lamps are supplied with invisible hydrophobic coatings which cannot be rubbed or scratched off and effectively prevent the formation of a film of moisture.

Lucite Fluorescent Units

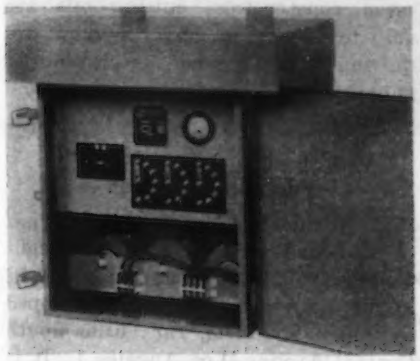
A CYLINDRICAL transparent housing made of Lucite and used with portable industrial lighting equipment has been announced by *Commercial Reflector and Mfg. Co.*, Los Angeles. The housing is practically unbreakable under normal working conditions and is water and vapor tight. A solid piece of Lucite rod inserted in the capped end is a positive seal against water and vapor. The plastic is not affected by water, gasoline or lubricating oils. The units are available in 6, 8, 15 and 30-watt sizes.

Circulator

DESIGNED for handling a large volume of liquid at low heads with minimum power requirements, a line of "Axiaflo" circulators has been announced by *Ruthman Machinery Co.*, 1810 Reading Road, Cincinnati 2. The units are equipped with full ball bearing, totally enclosed dynamic balanced motors. The sizes available are 4 in. equipped with ¼-hp motor and 6 in. with ½-hp. motor. The discharge capacities are 280, 700, 950 and 1200 gal per min.

Cathodic Protection Rectifiers

CATHODIC protection rectifiers designed to reduce to a minimum the galvanic corrosion of underground metal structures have been



announced by *Federal Telephone and Radio Corp.*, Newark, N. J. The rectifiers introduce a potential between the structure and the soil in a direction opposing the galvanic current flow. The rectifier is suitable for installation indoors or out, either on a wall or pole and is contained in a weather-proof sheet metal cabinet with drip-proof hood and hinged cover affording easy access to the control panel. Taps and links permit adjustment of the dc output which is indicated by an ammeter mounted on the control panel.

Skid Box Pallet

BUILT-IN pallets on skid boxes which permit quick dumping of heavy loads has been announced by *Elwell Parker Electric Co.*, Cleveland. With these attached pallets, an electric power truck equipped with a swivel mounted fork, picks up fully loaded boxes for transport to the loading platform where they are elevated and up-ended for quick dumping of the scrap into street trucks. The boxes have false bottoms, open at two ends. A steel plate as long as the box is turned up at a 90° angle for 5 in. at each side of the box. The upper edges of the bent-up sections are then welded to the lower edges of the box forming a trough or pallet about 4 in. deep integral with the box. The fork is thrust into the pallet opening, and the load lifted and conveyed to the shipping platform. When the box is turned upside down to empty the contents, it is held securely to the fork by means of the bottom plate.

Electric Immersion Heaters

AN electric immersion heater, designed for melting solid oil, greases and similar compounds in standard 55-gal drums and similar containers has been announced by *Edwin L. Wiegand Co.*, 7532 Thomas Boulevard, Pittsburgh 8. Steel sheathed heating elements form a complete circle around a tubular unit located in the center. This construction eliminates cold areas which would leave unmelted masses of material or which might cause the heater to tip over. Rigid construction is provided through the use of steel braces welded to the steel riser through which the electrical connections are brought out to a standard conduit box. The heater can be controlled by means of a three-heat switch or thermostat mounted directly on the terminal box.

Protective Roof Coating

AN asphalt roof coating combined with practically pure aluminum has been announced by *A. C. Horn Co.*, 43-36 Tenth Street, Long Island City 1, N. Y. Each particle of asphalt, it is said, is provided with a bright metallic reflector to throw back the destructive ultra violet rays. Both the asphalt coatings and the integrally contained aluminum are brushed on the roof. The asphalt sinks down to provide protection at the bottom of the coating next to and bonded to the roof whereas the aluminum stays at the top facing the sun and reflecting back the ultra violet rays. Called Hornlume, the coating consists of a protector and a deflector.

Steam Cleaning Compound

A HEAVY-DUTY steam cleaning compound, marketed under the name of Steam-Off, has been developed by *Turco Products, Inc.*, 6135 South Central Avenue, Los Angeles 1. It was designed to function without the loss of cleaning power in the hardest water and to prevent the depositing of hard water scale which clogs coils and other vital parts of steam cleaning machinery. Used as a stronger solution, Steam-Off has the ability to remove unwanted painted surfaces as it cleans.

Prefabricated Metal Sheets

A PREFABRICATED method of light metal assembly with panel sheets in ½ or ¼ in. expanded metal has been announced by *Lindsay & Lindsay*, 222 West Adams Street, Chicago. All parts are die formed to individual requirements. Only standard tools are needed. A panel sheet with specially drawn flanged edges is fitted over the flanges of channel framing. Tensioner channels are then applied over the edges of the sheet and are pulled down onto the flanged frame by means of socket lock screws. This automatically draws the sheet into uniform tension between framing members.

Spray Gun

A METALLIZING gun has been announced by *Metallizing Co. of America*, 1330 West Congress Street, Chicago. The exhaust opening of the gun is screened with a fine mesh screen to prevent dirt getting into the turbine housing when the gun is not in operation. The gun is said to be capable of spraying up to 14 lb of steel per hr, 40 lb of zinc per hr, actually 1080 ft of ⅛ in. zinc wire, and as much as 120 lb of lead per hr. In one operation, air, gas and oxygen are turned on in their proper

sequence and proportion, reducing gas fumes to a minimum and eliminating possibility of oxidation of the metal.

Safety Apron

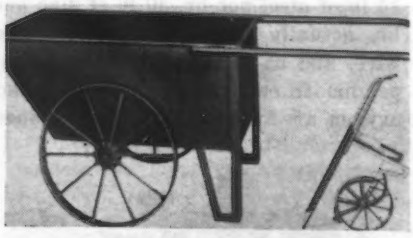
THE addition of the snap-strap to their StaSafe fabric aprons has been announced by *Standard Safety Equipment Co.*, 232 West Ontario Street, Chicago 10. The application of web straps and sliding snap fasteners is said to permit simpler adjustment. The aprons are made in a complete line of styles and sizes in both bib and waist types. Impregnated with StaSafe compound, they are said to protect against acids, caustics, solvents, flame, oils and paints.

Ear Protectors

SEPCO safety ear protectors have been announced by the *Universal Safety Equipment Co.*, 700 S. California Avenue, Chicago 12. The protectors which fit into the ear of the industrial worker filter sound and allow normal tones to penetrate. The protectors are made in a range of six sizes to assure perfect fit.

Multi-Purpose Cart

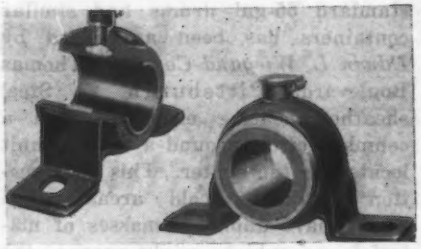
A MULTI-PURPOSE cart has been announced by *Palmer-Shile Co.*, 784 South Harrington, Detroit 17. The cart has a heavy steel body with a reinforcing flange around the top edge. Sturdy tubular handles extend 34 in. from the body. Legs are



of heavy angle iron and the construction is all welded throughout. It is equipped with two 24 x 2 in. steel spoke wheels. Overall measurements are 79 in. long, 30 in. high and 30 in. wide.

Fan and Blower Bearing

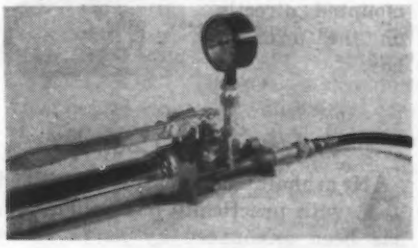
A BRONZE bushed bearing for small shafts especially adapted for fan and blower service, the Type F Bronzoil bearing, has been announced by *Dodge Mfg. Corp.*, Mishawaka, Ind. A bronze capillary bushing is used as a liner. The inner



housing is spherical to conform to a spherical socket in the formed steel outer housing which permits free self-alinement and avoids cramping the shaft.

Pressure Gage Tester

A MULTI-PURPOSE pressure gage tester which can be used for bench testing and for portable testing in the field has been developed by *Mansfield & Green*, Cleveland. On



bench testing, the unit can be used with test gages or with a dead weight attachment. A doubly sealed check valve completely eliminates leakage and loss of pressure even with grit in the system, whether using oil or water, and for pressures up to 10,000 psi. Principal uses of the unit include testing and repairing of pressure gages and instruments, the setting of relief or other pressure actuated valves and general hydrostatic testing.

Coolant Strainer

THE Metex Model G coolant and cutting oil strainer for grinders, lathes, broaching machines, hobbing machines, screw machines, drillers and boring machines has been announced by *Strainer Products Corp.*, 75-77 North Willow Street, Montclair, N. J. The G-18-6 strainer, illustrated, has 1944 sq. in. of strainage

area. Numerous types of Metex strainers of varying sizes are available to fit every type of machine. Clean strainer refills can be installed quickly and the old ones washed out. Because of the knit-wire and cotton mesh construction, cutting oils are said to run much longer without requiring cleaning, and the cleaner oil supplied is said to reduce wear and increase the life of cutting tools.

Air Filter Cleaner

FOR chemical cleaning of all types of air filters, including air-conditioning, engine, marine and aircraft, an air filter cleaner has been developed by *Turco Products, Inc.*, 6135 South Central Avenue, Los Angeles 1. It is said to eliminate the necessity of using distillate and other materials which leave offensive odors and are a fire hazard. Under the Turco process, the filter is removed and immersed for six minutes in a tank of cold Turco Aktiv, 4 oz to 1 gal of water. The filter is then removed from the tank and given a cold water hosing to flush away dirt and grease, after which it is dried in a stream of compressed air, and dipped into the specified oil. The process is said to take less than thirteen minutes. It is claimed that there is no attack on galvanized iron, and that the clean filter is left odorless.

Propeller Type Fan

TRANE Propeller Fans may be obtained with either 2 or 4 blade propellers with direct or belt drive, according to an announcement by *Trane Co.*, La Crosse, Wis. The two blade fans are available in sizes ranging from 15 to 48 in. in diam. Four blade fans start with a 10 in. diam. and extend through 72 in. Both belt and direct drive fans can be obtained with the motor outside the air stream. A new cradle type of fan mounting in a wide range of sizes of either 2 or 4 blade propellers is also being built. All standard fan motors and bearings are available.

Wash and Rinse Unit

A portable single stage washer which permits rinsing and washing in one unit has been announced by *Optimus Equipment Co.*, 137 Church St., Matawan, N. J. It occupies a floor area of 12 sq ft and comes complete with moving jets and easy operating vertical sliding doors that control splash and spray. It can be equipped with any type heating device and thermostatic control.

you wouldn't

lift a 500 pound load with a 100 pound capacity rope

It is just as foolish to put carbide cutting tools on an out-moded lathe. Carbide tools have increased horsepower requirements as much as 300 per cent.

Modern Jones & Lamson Lathes are designed specifically to carry this extra load, and more. They have the power, they have the rigidity, they are easy to operate.

FOR PRODUCTION MEN THE BIGGEST BATTLE LIES AHEAD—the battle of costs. Our jobs, and our earnings, as well as profits, will depend upon maximum production from the most efficient machines.

Now is the time to check your equipment. Plan now to scrap obsolete machines and replace them with good War Surplus machines or new machines. Our engineers will be glad to assist you.

What HORSEPOWER Are You Using?

The 16" Fay Automatic Lathe that is rough turning this 105 millimeter shell has to transmit *from 75 to 100 horsepower* to do this job on a production basis and take full advantage of the fast cutting carbide tools.

Engineered to "Carry the Load" for Most Productive Operation With Carbide Cutting Tools

JONES & LAMSON
MACHINE COMPANY
Springfield, Vermont, U.S.A.

Fay Automatic Lathes

Manufacturer of: Universal Turret Lathes • Fay Automatic Lathes • Automatic Double-End Milling and Centering Machines • Automatic Thread Grinders • Optical Comparators • Automatic Opening Threading Dies and Chasers.

Assembly Line . . .

STANLEY H. BRAMS

• Detroit's big question is "How Soon?" as confusion follows Jap capitulation . . . Steel hopes rise . . . Automotive Council nears end.

DETROIT—The automotive industry's migraine this week has a throbbing refrain of "How soon?"

How soon can integrated production atomized by sudden Japanese capitulation be synthesized into full scale peacetime production? How soon can suppliers put together the bits and pieces? How soon can the steel industry change from khaki and blue to mufti? And, from the workers, how soon do we again punch the clock regularly?

There is only one sure answer in the whole catechism. Automobile production has been set back at least a week and probably more. Toddling output sat down with a bang when the big news broke. In terms of units, the production loss was modest, but the break in momentum and certainty of peace was far more important than the short vacation period.

Ford, Hudson, Packard, Briggs, and several parts plants did not even attempt to resume until this week. General Motors, Chrysler, and Graham-Paige gave back-to-work orders for Friday. The Ford assembly plant at Louisville, Ky., which had been slated to start last Thursday, delayed until a day or two ago, and the Dallas assembly plant postponed its opening from Aug. 20 to Aug. 28.

In the long run, of course, war contract terminations will provide a whopping transfusion. Opinion here, though little crystallized, concedes that under the best of circumstances the spurt still will not become strongly evident before the fourth quarter.

Cancellations—about $1½ billion from the Ordnance District alone—have not been entirely the swift guillotine stroke expected, but rather a jagged disemboweling with a dull knife. Ford's tank-engine contract concentrated at the Lincoln plant first was snuffed out, and then had new life blown into it expected to sustain it through the winter. Some liberally scattered B-29 components contracts seem to be hanging on by the teeth. But the sprawling Pratt & Whitney engine contract which Ford had scattered through its own and government owned facilities here and at Kansas Ctiy, Memphis, and St. Paul, with 11,000 workers, appears to be a definitely defunct pigeon.

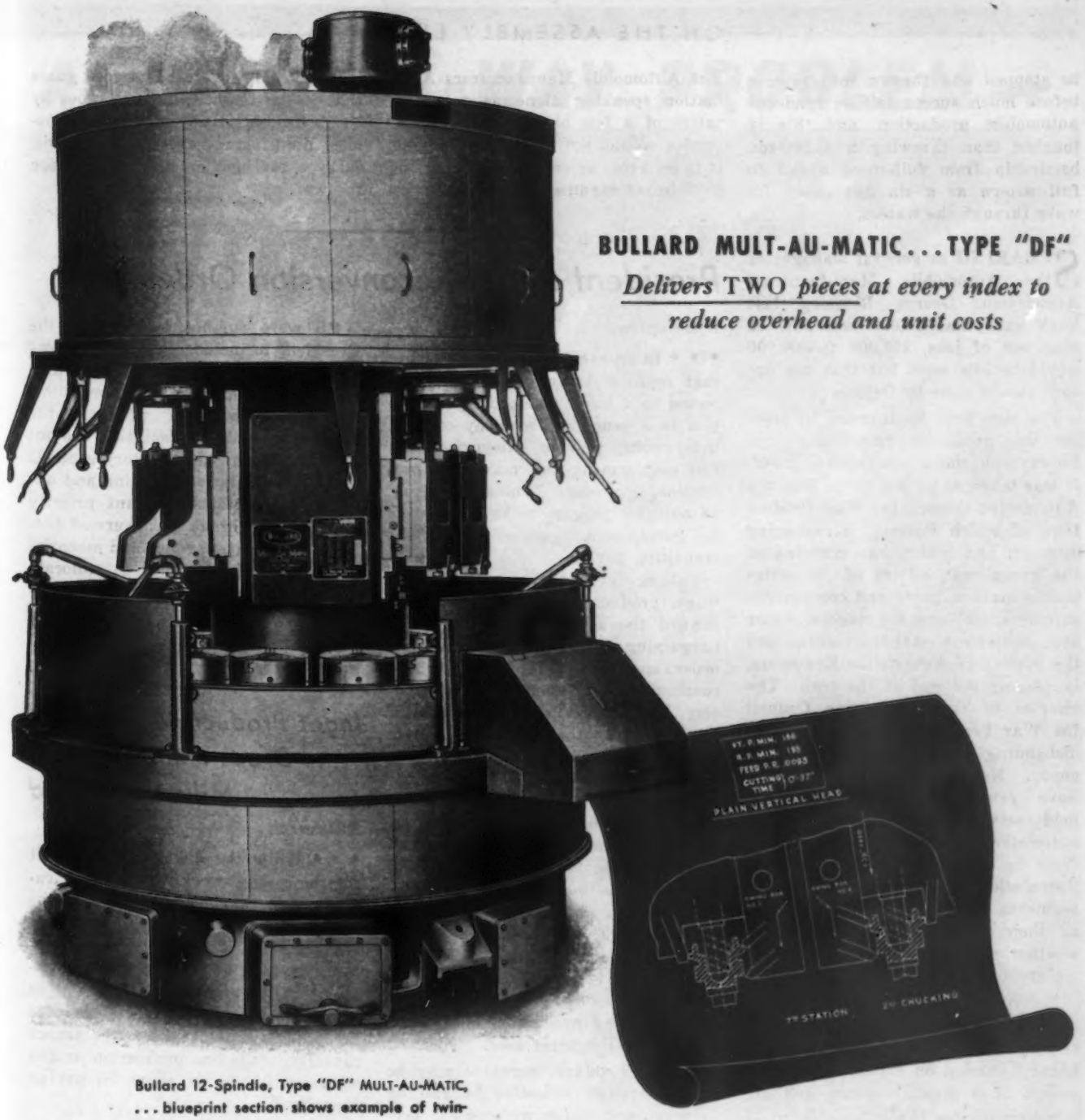
The uneven character of terminations complicates the plant clearance problem, makes it difficult to lay fundamental plans to draw vacated facilities into the automotive production fabric. The government is on the spot. Fundamental precepts of rapid plant clearance, designed to function under conditions of gradual termination, now face a hurricane howl of "Where do we put the stuff?" Industry requires split second decision rather than leisurely consideration on plant disposal if war-built structures are to figure in high-speed production plans. RFC warehouses, though of a temporary nature, have not been designed as terminal resting points for surplus equipment, but rather as filters through which equipment could be moved to industry or scrap. Mass terminations most certainly will clog the filters. As for plant disposal, the Surplus Property Board will have to make up its mind more rapidly as to the exact character of its powers in order that the farce which scared away United States Steel Corp. from the big Geneva, Utah, steel plant be not repeated. Despite efforts of the RFC to interest purchasers, current reports from prospective buyers indicate that plant disposal is stalled at the Surplus Property Board level through the board's stuttering concept of its powers.

SEDIMENT raised in the muddy steel delivery situation has not settled. When the waters clear, it is definitely known that rating preferences given to such civilian industries as farm equipment, railroads, and railroad equipment; authorizations for partial requirements to some consumer goods manufacturers; and authorizations to certain civilian government agencies still will be clinging tight to rolling schedules along with particles of military contracts which have not been cancelled. How much rated tonnage will remain intact is impossible to estimate here, and probably even WPB will have no exact idea for at least another week. Quite probably the curve of rated orders will vary considerably among individual companies. There will be plenty of steel left for civilian customers, but there also is the probability that considerable shifting of orders must be done to secure optimum deliveries.

Even companies with long standing non-rated orders on the books in many cases will receive their first indication that their needs are being cared for when they receive the pleasant news that their steel is being rolled. Many steel producers are invoking an informal allotment system on their own hook in order to quickly spread available mill space, thus providing some steel for their major customers as soon as possible. For the time being, the whole situation simply spells confusion.

Starting from a gradual trickle, the general probability is that the auto makers will receive sheet steel as fast as they are prepared to take it.

As last week ended, it was apparent that war contract cancellations were only beginning to seep down to tributary automotive suppliers. Detroit tool and die shops, one of the foundation stones of the automobile industry, still were almost completely engaged in war production, nobody having told them officially to stop. Hesitancy by these lower production tiers to put on the brakes themselves stems from the knowledge that production of some war material will continue and that research and development programs will not be affected. This war momentum must



BULLARD MULT-AU-MATIC . . . TYPE "DF"

Delivers* TWO *pieces at every index to reduce overhead and unit costs

Bullard 12-Spindle, Type "DF" MULT-AU-MATIC, . . . blueprint section shows example of twin-tooling at one station.

There is only one way to match the twin-spindle, twin-tooling output of the six or eight working stations of a Type "DF" Bullard MULT-AU-MATIC on work up to 8" in diameter and 10" in height . . . and that is to install two ordinary MULT-AU-MATICS. Yet the former costs only slightly more than *one* of the latter.

Consider how unit costs nose-dive when a twin-spindle MULT-AU-MATIC produces two finished pieces in the time of the longest single boring, turning, facing, threading, grooving or drilling operation plus the few seconds required for indexing.

To learn more about how Bullard Twin-6 and Twin-8 Type "DF" MULT-AU-MATICS deliver the kind of low-cost production needed to keep America working and buying at peak levels . . . write today for Bulletin "DF1".

From government surplus lists of available equipment select the better machines to replace those obsolete models you've been using on secondary non-critical operations. Ask Bullard for information on these old models by serial number. The Bullard Company, Bridgeport 2, Conn.

From Government Machine Tool Surplus Lists select the better machines to replace obsolete models you've been using on non-critical operations. Ask Bullard for information on these models by machine number.

BULLARD

CREATES *NEW METHODS*

TO MAKE MACHINES DO MORE

be stopped and thrown into reverse before much succor can be rendered automobile production, and this is tougher than throwing a 45,000-ton battleship from full-speed ahead to full astern as a tin fish shows its wake through the waters.

SPEAKING as general manager of the Automobile Manufacturers Association, George Romney last week said that 16,000 war-workers were out of jobs, 250,000 to 300,000 would be idle soon, but that the upturn should come by October.

The title used by Romney in making this prediction raised more eye brows than the announcement itself. It was taken as an indication that the Automotive Council for War Production, of which Romney is managing director, and which has coordinated the group war efforts of the automobile makers, parts and components suppliers, tool and die makers, motor and equipment manufacturers, and the Society of Automotive Engineers, is nearing the end of the trail. The charter of the Automotive Council for War Production provides for its disbanding following the war emergency. No formal steps to this end have yet been taken, but it is held certain that the destiny of the automotive industry's coordinated efforts is even now being discussed. Speculation centers on whether the segments of the industry will revert to their respective associations or whether some common front will be maintained.

Before the war, the Automobile Manufacturers Association maintained a statistical service, an extensive patent library, carried on export market research of a general nature and did other chores for the automobile makers. Most of these functions were absorbed by the Automotive Council when it was formed 24 days after Pearl Harbor. The Council, with a far wider scope, was active in listing idle facilities, clearing information on production techniques, dabbled in the manpower field and in general acted as expediter on the industry's war problems. Possibly its most important long range function, however, has been its status as a spokesman for more than 500 companies comprising and serving the automotive industries in their relations with the government and the public.

This is the function for which some segments of the industry feel that there will be a continuing vital need. The Automobile Manufacturers Association speaking alone as representative of a few big automobile companies would not carry the weight, it is believed, as one representing the total broad expanse of the automotive industry. However, it is a good guess that if the Council, as such, goes by the board, activities of the Automobile Manufacturers Association will carry a far heavier sock than before the war.

President Issues Reconversion Order

Washington

• • • In an executive order declaring that reconversion efforts shall be directed to a swift and orderly transition to a peacetime economy of free, independent private enterprise with full employment and maximum production, President Truman on Aug. 18 outlined policies to be adhered to by government agencies during the transition period.

Calling for the removal of price, wage, production and other controls toward the restoration of collective bargaining and the free market, the order emphasized the necessity for continuing stabilization of the economy through fullest utilization of powers under the Emergency Price Act and Stabilization Acts.

OPA must continue efforts to assure that the cost of living and the general level of prices shall not rise, the order directed, but adjustments in existing price controls necessary to remove gross inequalities or to correct maladjustments or inequities interfering with the transition to a peacetime economy are authorized. Such price adjustments, however, should not cause price increases at later levels of production and distribution, the President said.

Wage or salary increases may be made, through collective bargaining or voluntary action without the necessity of obtaining prior approval, the President directed, provided that such increases will not be used as a basis for seeking increases in price ceilings or resisting otherwise justifiable price ceiling reductions.

Authority is granted the WLB or other designated agency to approve such increases as may be necessary to correct maladjustments or inequities in wage rates that would prove detrimental to reconversion.

Where a proposed wage or salary increase will require a change in the price ceiling of the commodity or service involved, the order requires that the approval of the Director of Economic Stabilization shall first be secured.

The reconversion duties of the WPB were further outlined by the President to include the use of all its authorized powers to expand the production of materials in short limit the manufacture of products for which materials or facilities are insufficient, to invoke inventory controls to avoid speculative hoarding and unbalanced distribution, grant priority assistance to break reconversion bottlenecks, facilitate relief and essential export programs and to allocate scarce materials and facilities necessary for production of low-priced items essential to the continued success of the stabilization program.

Ingot Production Drops; Finishing Mills Unaffected

Pittsburgh

• • • While the district's steel melt for the coming week will be comparatively low, the finishing mills of the steel plants will be operating at a fairly high rate. Wheel and axle production will be near 100 pct of capacity, while plate production will be very low. Rail and structural rollings are expected to be above 80 pct of capacity, while bar production on the whole will only be about 50 pct of capacity.

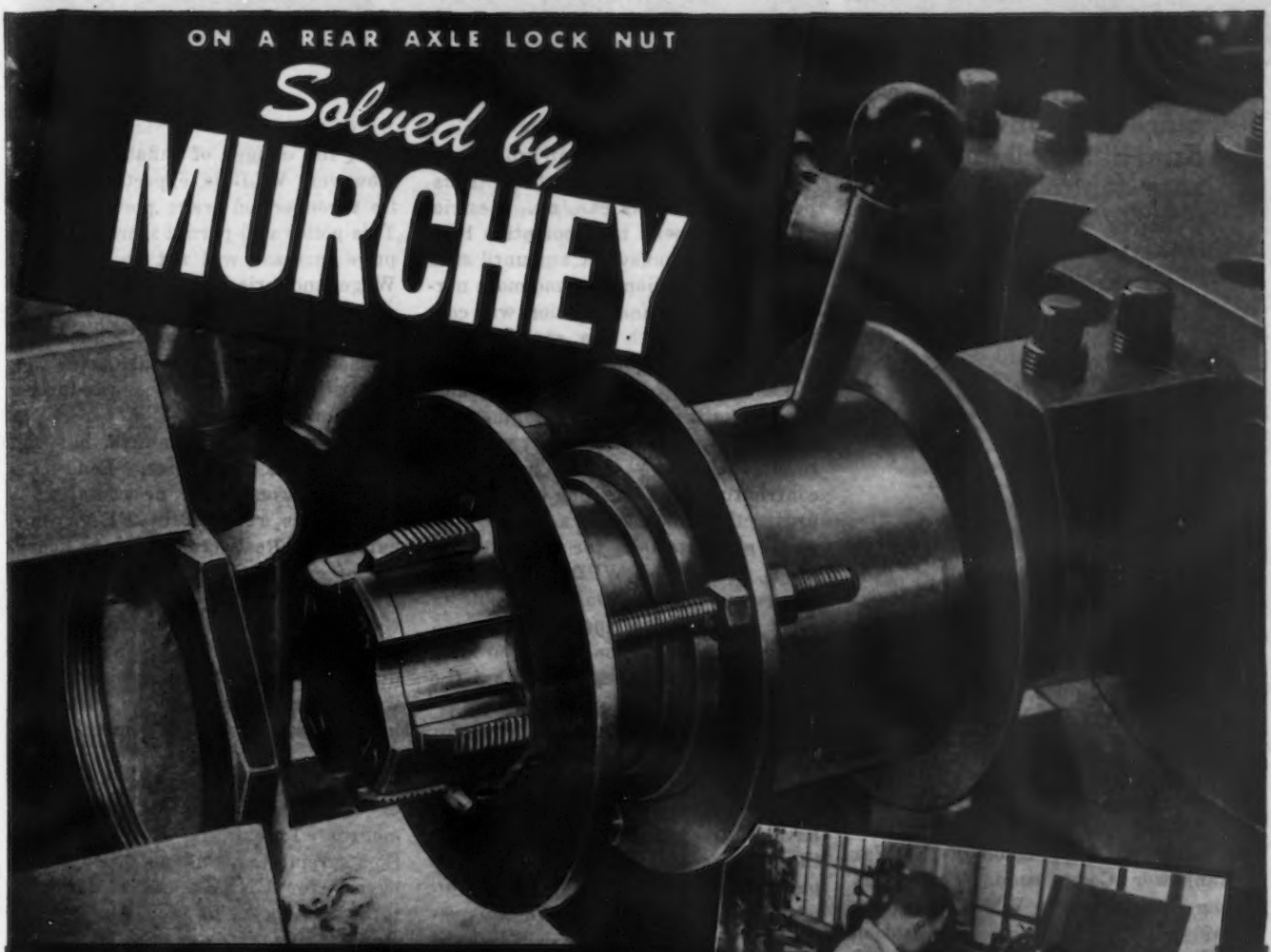
Flat rolled production will be quite high, considering the fact that mill schedules have been completely upset by cancellations of government contracts. Hot rolled sheet production will be about 70 pct of capacity, while cold reduction will be considerably higher. Galvanized sheet and long terne output will be in the neighborhood of 80 pct of capacity as will tin mill products output.

The obvious plan of steel producers is to use up steel in ingot and semi-finished form and let steel production lag until such time as the mill schedules and melt needs are clarified. Consequently, while the ingot production is low this week, finished steel production and shipments will be considerably higher than expected.

A TOUGH 3-WAY PROBLEM—

ON A REAR AXLE LOCK NUT

Solved by MURCHEY



Photographs by courtesy of The Timken-Detroit Axle Co

1—Heat treated material—and that's a tough problem. 2—Getting the tapping to precision limits—another tough one. 3—Quality plus quantity production—a third problem.

The large illustration shows a 6140 heat treated steel rear axle nut—thread size 3⅜" x 12. This nut is threaded in less than *eight* seconds actual cutting time — and is held to a precision limit of .002 on pitch diameter. This is another case where MURCHEY tools prove able to produce both precision limits and quality finish without employing mechanical lead. It shows again how efficiently Murchey can engineer threading tools to your specialized applications. If *you* have a threading problem, you have available in Murchey the skill and experience of over 40 years intensive specialization.

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● *Murchey manufactures all types of Collapsible Taps, Self Opening Die Heads, Thread Milling Machines and Shell Tapping Machines. Write for Catalogues. Address Dept. I.*

MURCHEY

Washington . . . L. W. MOFFETT

• Cracking the war agency front may require major invasion . . . Krug lifting all unnecessary controls . . . Some priority extension allowed.

Washington

• • • Plans for cracking the mobilization atom in Washington have gradually unfolded since VJ-Day. The job may not prove to be an easy one. however, as the problem is noteworthy for its cohesiveness.

Centering on the removal of manpower controls, the initial experiment calls for the chipping off of the War Manpower Commission. There has been built up within WMC during the war years an extensive organization dealing with every aspect of the manpower problem—recruiting, control, training, utilization. Having served its purpose during the periods of tight labor supply, its functions will be drastically reduced to the extent that they will deal exclusively with the functions of reemployment and channelling of workers from war into civilian industries as administered by the USES. Whatever segments of WMC that survived the war emergency may ultimately come under the Labor Dept.

Two component agencies scheduled for almost immediate separation are the Office of War Information and the Office of Censorship. The OWI has contributed the greatest quantity of informational matter in the way of releases, reports and statements for domestic and foreign consumption ever attempted by a publicity organization. While operating more or less beyond the public eye, the Censorship Bureau has vigilantly scanned all civilian communications between the United States and foreign countries.

Although not among the first to be eliminated, the ODT will go out of existence as soon as wartime transportation problems ease up. Restrictions on highway transportation have been relaxed somewhat but until such a time as conditions become more normal, railroad transportation will continue under much the same restrictions as are now in effect.

The War Production Board, which has been given the task of engineering the reconversion of industry, will continue until there are no bottlenecks confronting the transition effort. With prospects of more than adequate supplies of materials for reconversion needs, it will be WPB's job to get things moving as soon as possible in order to minimize unemployment resulting from cessation of war production. It has been suggested that the remaining functions of WPB be transferred to the Commerce Dept. for whatever peacetime use can be found for them.

Two other agencies which will not have outlived their usefulness until the reconversion period is practically passed are the War Shipping Administration and Petroleum Administration for War. The WSA will be kept busy for many months by the shipping problems arising from the return of our troops from foreign soil. PAW will also continue for some time although its duties will decrease with diminished petroleum demands. The supply problems of the armies of occupation will require some form of limited petroleum allocations.

Since War Mobilizer Snyder views the threat of inflation as the greatest single danger to an orderly reconversion, price control will be continued until reconverted facilities can turn out supplies in sufficient quantities to satisfy demand, probably until the middle of 1946 at least. Price controls on some luxury products have been lifted and others will follow as supplies increase to justify such action. Price ceilings will be maintained for most products and commodities in short supply. VJ-Day should bring an immediate liberalization of OPA's cumbersome reconversion price policy, which has been holding up reconversion in many industries.

Wage stabilization will be continued until the danger of inflation is past. However, WLB is expected to issue its reconversion wage policy shortly. This policy will permit increases when price increase will not be necessary. Wage and price adjustments will be granted where necessary to raise substandard pay scales, relieve hardships from severe declines in take home pay, and stimulate increased production of essential products.

FEA's task will diminish, but will continue for some time. Lend-lease must be wound up, necessitating a tremendous revision in FEA's procurement. Restrictions such as licensing of exports and control of imports will be dropped slowly until such a time as FEA decides that world trade conditions will permit American industry to operate independently in world markets without the danger of inflation and a wild scramble for materials.

Some of the procurement sections of FEA will function for many months. Through its subsidiary U. S. Commercial Co., and as procurement agency for UNRRA, FEA will continue to be a small factor in government buying. Programs of the U. S. Commercial Co., involve development of trade with the Philippines and procurement of relief supplies for Greece. The extent to which FEA engages in work for UNRRA will depend upon the appropriations made by Congress for this purpose.

VJ-Day saddled the Surplus Property Board with perhaps the biggest task of all the war-created agencies, a task for which it is ill prepared at present. Congress is expected to revise the Surplus Property Act when it reconvenes in September and the appointment of a single administrator will undoubtedly be called for in the amended law. It is also indicated that Congress will eliminate some of the troublesome priorities in the law which are slowing up surplus property disposal.

Another agency which is confronted with a huge postwar job is the Office of Contract Settlement, but OCS is much better prepared to carry out its program. Original estimates of $30,000,000,000 in canceled contracts immediately after VJ-Day have been confirmed, according to Robert H.

ORDINARY BEARINGS

of wave peaks indicate the spindle position each revolution. The irregularity in position he wave tips indicates a slight fluttering of spindle axis.

THE FILMATIC PRINCIPLE

Self-adjusting shoes produce independent, converging oil films which develop high radial pressures, forcing spindle into central position and keeping it there. "The wedge-shaped oil film does the trick."

FILMATIC BEARINGS

No discernible spindle flutter. The even alignment of the wave tips in this oscillogram indicates a true running spindle.

FILMATIC

QUICK SPARK-OUT

Saves Time
Improves Accuracy

Grinding a milling machine spindle on a CINCINNATI 10" Plain Hydraulic Grinder with FILMATIC Spindle Bearings. Catalog G-490-1 contains complete specifications.

Take a good look at the two oscillograms shown above. Notice the spindle flutter when ordinary bearings are used as compared with the complete absence of flutter with FILMATIC Bearings. The wedge-shaped oil films build up exceptionally high pressure to hydraulically maintain dead center rotation. This FILMATIC Bearing characteristic assures quick spark-out and consequently more rapid attainment of accurate dimensions.

That CINCINNATI Grinding Machines, all equipped with FILMATIC Bearings, merit serious consideration is evidenced by the fact that over a period of several years, they never have had any down time charged against them because of grinding wheel spindle bearing failure. This alone would be reason enough for you to choose CINCINNATI's but in addition to the long life of these bearings, and the quick spark-out feature, there are many other advantages you're going to like. The entire story is contained in booklet G-446. A copy will be sent on request. Sweet's Catalog File for Mechanical Industries gives a brief description of CINCINNATI Centertype and Centerless Grinding Machines and Centerless Lapping Machines.

CINCINNATI

CINCINNATI GRINDERS INCORPORATED CINCINNATI, OHIO, U.S.A.

CENTERTYPE GRINDING MACHINES . . . CENTERLESS GRINDING MACHINES . . . CENTERLESS LAPPING MACHINES

Hinckley, OCS director. Concrete policies and procedures for settling these contracts have been developed, and have been given a substantial test in the settlement to date of more than $22,000,000,000 of canceled commitments.

* * *

• • • Aimed toward the smoothest possible transition from wartime conditions to a peacetime economy of full production and employment, the report on WPB's plans for V-J Day released by Chairman J. A. Krug on Aug. 16 calls for the immediate lifting of all unnecessary and obsolete controls. At the same time, however, the danger inherent in a too rapid withdrawal of all WPB controls is recognized.

Although amply providing for extension of priorities assistance, if needed, to break reconversion bottlenecks, assist small business in procuring materials, assure fulfilment of foreign commitments and to meet continued military and essential civilians' needs, the report points up the widespread misunderstanding of the "magic" efficacy of priority ratings. The WPB, Mr. Krug said, will use its authority to such an end sparingly where conditions warrant.

Pointing out that the intelligent approach by government and industry is necessary to solve reconversion problems, Mr. Krug emphasized that a lot of "wand waving" and "master planning" in Washington would delay progress to the extent that industry taking the initiative would be way ahead on the path to a reconverted economy.

Materials needed by reconverted manufacturers, with the possible exceptions of tin and crude rubber, will be shortly in such plentiful supply that they will be "running out of our ears," Mr. Krug said. In the case of steel, military requirements were estimated roughly at around 4 pct of the normal quarterly supply, as a result of a 99 pct decrease from stated requirements. The only possible tight spot in the steel picture, Mr. Krug said, was in galvanized sheets but that too is expected to clear up very shortly. Aluminum and copper will also be in ample supply, he said.

With regard to the necessity of continuing some controls, the report stated that orderly relaxation and revocation must be spread over a period of weeks or a few months to avoid unnecessary dislocation. During the transition period, it will be vital that the greatly reduced but continuing military requirements for our forces of occupation and for troops awaiting demobilization be fully met. At the same time a smooth transition will be impossible unless steps are taken to prevent hoarding of scarce materials so as to avoid an inflationary scramble.

The report emphasized the need for continuing efforts to produce low-priced merchandise essential to the stabilization program and recommended that scarce materials be directed into those production channels.

In order to avoid unnecessary confusion, outstanding AA ratings and CMP allotments will continue in effect until Sept. 30, the report said, including the special preference given small manufacturers under Priorities Regulation No. 27. It was also recommended that MM ratings continue in effect for a time to protect military orders. The WPB will continue to grant special assistance for military, emergency civilian or export needs which cannot be otherwise fulfilled.

Although there is no longer need to continue scheduling under order No. M-293, the report proposed that the order be retained so that it may be invoked in the event that a serious shortage of a particular item should occur. Delivery schedules which are frozen for varied periods may continue in effect until Sept. 30 subject to individual directives.

With regard to WPB orders, all but a small number of the remaining E, L, M, P, R and U series will be revoked immediately. This includes the revocation of production ceilings on automobiles, metal furniture and other items now under such restrictions. In the case of certain orders where a seriously short supply of material is expected to continue for some time beyond the end of hostilities, and where clearly essential needs might be risked by immediate revocation, the relevant orders should be retained for some period beyond V-J Day. Such orders include conservation measures for tin and rubber, certain distribution controls covering textiles, leather, forest products and a few other materials, and orders governing the use of particularly scarce imported materials.

Order L-41 was relaxed so as to permit all manufacturing and other industrial, but not commercial, construction to proceed without WPB authorization. As soon as the effect of V-J Day military cutbacks on building materials and supplies can be appraised, a decision will be reached as to further relaxation or revocation.

The WPB will retain its general inventory controls as long as needed, at the same time expanding the exemption list in Order M-161 to cover all materials clearly in surplus.

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Get Carboloy Quality and Savings on Your

PRECISION FINISHING

. . . at Tool Investment Costs as low as 45c each

For long tool life, low tool cost and low machining cost per piece, combined with outstanding quality of work produced, use Carboloy Round Shank Tools!

Available at tool investment costs as low as 45c, Carboloy Round Shank Tools are now widely used by industry on work requiring tolerances as close as .0001" and on parts requiring mirror-like finish.

Carboloy Round Shank Tools are stocked cylindrically ground, with either back rake or flat top, in sizes 5/16" through 1/2" . . . or as solid cylindrical blanks 3/32" through 1/4" diameter. You quickly grind to suit. Write for Catalog GT-175R.

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CARBOLOY "ROUND SHANK" BORING TOOLS

West Coast . . .

OSGOOD MURDOCK

• Industry here bouncing off VJ-Day ropes . . . Southern California hardest hit . . . Kaiser-Frazer models set . . . Pacific States Steel builds 22-in. mill to roll 8-in. shapes.

SAN FRANCISCO—Bay Region heavy industry, taking stock after a succession of hilarious V-Days, finds itself in a far less happy situation than the plate glass manufacturers. As "the city that knows how" sweeps up the debris of practically a week-long celebration there appears to be almost as much tonnage booked for replacement of plate glass store windows as there is for plate steel.

Initial effect of premature—and subsequent—victory celebrations was the virtual (although it had very little to do with virtue) quickie shutdown of almost every steel mill in the Far West. Men walked off the job after the first rumor, and in most cases just didn't show up until after a long weekend. When the whole procedure was repeated after the official announcement and complicated by the necessity of paying report time when short crews showed up, one plant, with half an eye on its insurance rate, closed until Monday the 20th.

In a quick round-up of immediate prospects and effects it appears that the Coast's smaller independent mills have received cancellation notifications amounting to only a fraction of a pct of their capacity.

Hardest hit was Geneva with immediate cancellation of 500,000 tons of Navy plate. Now operating are two furnaces, three open hearths and one-half the coke ovens, and the sudden termination of the war re-emphasizes the need for immediate action from Washington on the disposition of Geneva. The original plan contemplated continued operation at least in a stand-by capacity for a period of eight months after termination of the war. Now that actual disposition of the plant becomes imminent instead of speculative, regional self-interest asserts itself more positively.

THE Salt Lake City chamber of commerce, declaring that the Kaiser steel program for the West gives Geneva only a secondary role, is demanding that the Provo facilities be sold or leased to an organization which "will provide Utah with a steel plant of a type that will give the state the foundation for an integrated industrial economy and not establish an operation which would process Utah's raw material for shipment elsewhere for further processing and fabricating."

Simultaneously Utah businessmen indicate that officials of the Department of Justice and from the Surplus Property Board, on a recent trip to Utah, have been considerably impressed with the "magnificent" work of Dr. Walther Mathesius and his associates.

Columbia Steel's coast plants have received some cancellations and more are expected momentarily as hourly developments take shape. However, bread and butter items are not affected, according to company officials.

While still getting squared away at Pittsburg, Calif., from the effects of the spontaneous work stoppage, principal item of interest on the Columbia docket is the status of the $25 million sheet mill expansion. The company acknowledges that plans have been in the engineering stage for some time and while they will not officially admit specifications are out for bids, neither will they deny it. Officials agree that peace and contract cancellations have done nothing to retard the prospects of immediate groundbreaking.

Labor difficulty arising in the galvanizing department over safety equipment precipitated a work stoppage at Torrance last week which has not yet been resumed. Under terms of the Torrance plant's labor contract negotiation is impossible while a strike or work stoppage is under way, so solution of the difficulty awaits return of the men. Columbia executives say that additions to the Torrance facilities are not under immediate consideration, but that labor relations are bound to influence any future plans.

FONTANA'S recent drive to add commercial orders to its backlog is standing Kaiser in good stead. Like Geneva, Fontana has had its Dagwood orders abruptly canceled along with plate orders for barges, aircraft carriers and shell steel. However, merchant mill and commercial orders are booked through the end of the year and the company has two months' orders for structurals, and is quoting September and October delivery for plates.

Immediate status of the Kaiser-Frazer West Coast automobile imponderable is extremely fluid. What had been expected to be a two or three week series of conferences between production and engineering officials of the Graham-Paige and Kaiser staffs have abruptly terminated in selections of models for both eastern and western manufacture after only a single week. Precipitate agreement on the part of both staffs, coupled with the cessation of hostilities has moved production date up perhaps to the latter part of 1945 instead of early 1946.

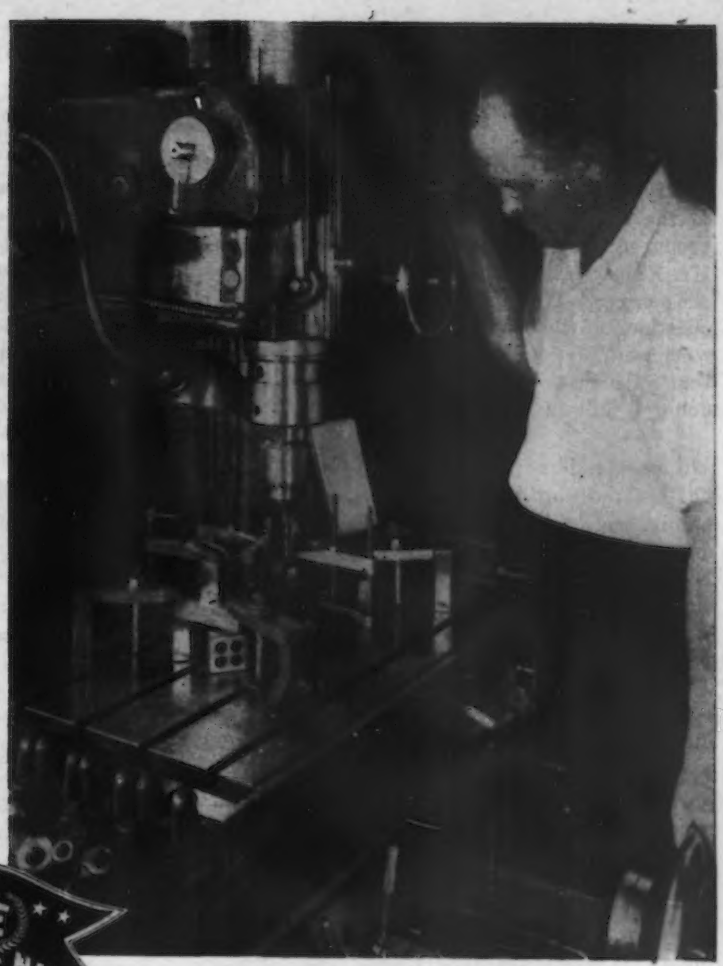
Confusing—especially to plans for Fontana—is the question of where the steel for the Kaiser cars will come from. It had been hoped in the Kaiser-Oakland headquarters that events might permit the addition of strip and sheet facilities to the Fontana plant in time to coordinate with production of the West Coast automobile, regardless of the site of the manufacturing plant, while steel for the Frazer car would naturally be supplied by eastern mills.

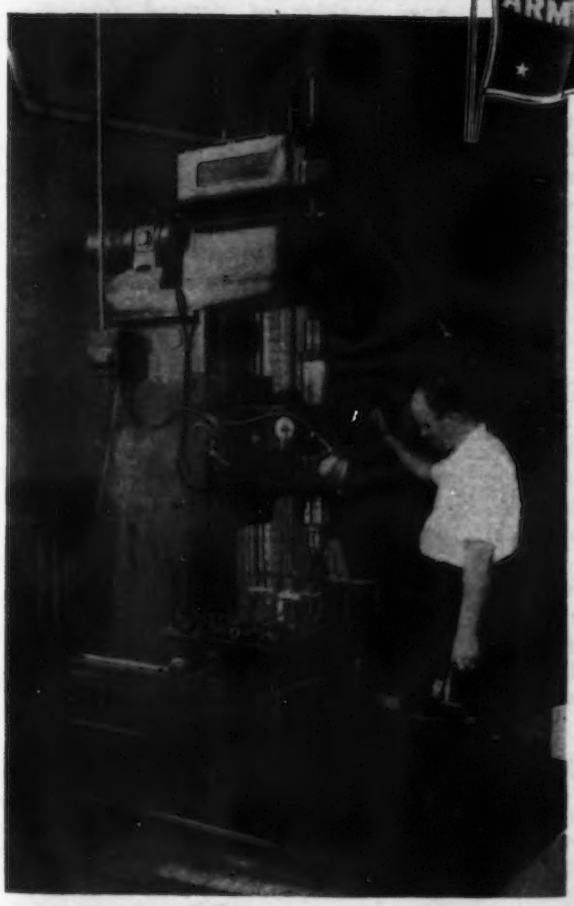
With the multiple Kaiser projects resembling the "he's up, he's down, he's up again" type of football broadcast, one expeditionary force is reported to be making progress in Denver, Col., but negotiations pertaining to an all-Western steel syndicate, if not sufficiently confused by the sudden cessation of hostilities are not being advanced by withholding the results of the RFC McKee report on Geneva, and are proceeding, so to speak, apace.

In the recent interchange of news-

Here's
the sure
way to maintain
accuracy on precision
boring, drilling and tapping operations

FOSDICK
JIG BORER





● The job illustrated is typical of the versatility and accuracy of the Fosdick Jig Borer. There are four holes bored; 2—.250", 1—.625", and 1—.498" and three screw holes spotted with work in this position. For the second operation the work is mounted on angle plate by means of a sub plate and positioned by a pin through one of the holes previously bored. In this position a 17/64" hole is drilled and three other holes tapped.

There were only 11 pieces in the lot and it took about 1½ hours to complete each piece.

For your precision jobs in small lots or on high production work you can depend on the Fosdick Jig Borer. ***For detailed description write for Jig Borer Bulletin J. B. I.***

FOSDICK MACHINE TOOL COMPANY
CINCINNATI 23, ··· OHIO

paper repartee between Eugene Grace of Bethlehem and Henry Kaiser of Fontana regarding Bethlehem's ability to deliver steel more cheaply to the Pacific Coast than it can be produced here, steel men think that Mr. Kaiser missed the boat. Instead of being overly-concerned with the question of who owns Fontana, they wish that Mr. Kaiser had asked, "If that's the case, why haven't you been doing it all this time?"

* * *

Judson reports that it is in a very flexible position and not at all unhappy, and booked through December and January. Pacific States Steel at Niles is another white spot on the steel map with trivial cancelations. So far, this company anticipated the present chaotic situation and is undergoing a voluntary shutdown.

In preparation for a return to civilian production Pacific States has been quietly improving its entire operation, switching wherever possible from manual to mechanized handling. The company is also installing a 22-in. mill which will permit them to produce shapes up to eight in. Instead of rolling from ingots as they are now doing, the new breakdown mill will enable them to roll from billets, producing a better steel and eliminating random lengths.

Like many another fabricator, Western Pipe & Steel also finds itself in pretty fair shape. They have received some cancelations and are expecting more, but not in sufficient quantities to have any serious effect on operations. Work on four cargo vessels is continuing and waiting for refrigerating materials. Like other firms in a similar category, Western will know better in a few days where it stands than it does at the moment.

* * *

GAR WOOD INDUSTRIES, INC., in what appears to be the latest addition to the Bay Region roster of industry, is planning to build a plant complete within six months to manufacture a sizable line of heavy contractors' equipment.

Locations are still under inspection in several northern California communities with San Francisco suburban sites receiving particular attention. Equipment slated for western manufacture include all types of earthmovers; truck hoists from ton-and-a-half to 34-ton truck bodies and tanks.

Bethlehem, like the other major steel producers on the Coast, is assaying the total extent of its cancelations, and is concerned with how soon it can proceed with construction of its new San Francisco warehouse. Officials of West Coast Bethlehem say that their shipbuilding operations, cut back eight months ago, constitute their principal contraction. Unrated orders and backed up demands for civilian items are expected to keep the mills producing with practically no change in operating rate or employment figures.

LOS ANGELES—"Thousands Losing Jobs in Los Angeles Air and Ship Plants" was the nine column banner headline across the Herald Express, Aug. 16, in recording the immediate effect of Pacific peace in southern California. Douglas will release 38,000 in all its plants and Calship immediately dropped 3500, beginning a "huge jobless parade" which may reach a total of 200,000 in the next few months, according to local estimates. Most industry was expected to return to a 40-hour week. The first impact of the immediate unemployment retreat seemed to pose such a perplexing problem that the Japanese surrender took second place billing, as an anti-climax. It is estimated that Los Angeles county has more than 300,000 workers who must be shifted to civilian goods manufacturing, of whom half are in aircraft plants, including sub-contractors. Leaders in the aircraft industry estimate that production will be reduced from 90 pct to 95 pct of wartime peak. The gradual mustering out of California's 500,000 men and women from the armed forces was also an overhanging picture to swell total anticipated unemployment figures.

An increasing trek of temporary resident war workers from the East, Middle West and Central Southwest back to their homes is providing a trifling escape valve, but first impressions indicate that unemployment pressure in the Far West will be most severe in southern California.

SEATTLE: First appearances indicate that Puget Sound will not know the war is over for quite some time. Apparently most local plants and factories will be kept busy with a full order of work for at least several months.

Boeing Aircraft Army contracts call for 155 B-29s for the month of August, and half that number in September. From then on Boeing will turn out 20 Superforts each month "to keep the peace." No dismissal of personnel is contemplated since voluntary terminations are presently in balance with production schedules. Gradually sub-contracts in branch plants will be tapered to concentrate production at the Seattle home plant. Boeing has additional Army contracts for a number of C-97s, the new transport ship, and its commercial version, the Stratocruiser, is being considered by a number of airlines.

Since shipyards have been changing over from new contract to repair work for the past six months, the declaration of peace makes no change, and in fact is expected to augment the repair load, now 60 pct of all shipyard activities. Todd-Pacific at Tacoma is stopping work on seven ships, but continues with five carriers and two destroyer escorts. The present program here calls for a gradual reduction of workers, 2000 a month, through a ten-month period. This yard is only beginning its repair program. Isaacson Iron Works is glad to look forward to the end of its naval-marine work, since it has a huge backlog of demand for its lumber and industrial equipment, winches, dozers and tractor attachments. It is presently estimated by the industrial department of the local chamber of commerce that there will not be more than from 10,000 to 37,000 unemployed in Seattle and its vicinity in the immediate postwar period. Only local worry is involved in Washington State's workmen's unemployment pay of $25.00 a week for six months, which many believe will induce workers to hold war jobs until released, and then collect benefits for maximum duration.

In the long run, there is tremendous local optimism for industrial and job development throughout the Pacific Northwest, as a result of the war influx of population, the development of natural resources, the abundance of cheap electric power, and the vast interior agricultural lands that will become intensively farmed within the next decade.

Chrysler Cuts Announced

Detroit

• • • Virtually all its war contracts, except those covering phases of atomic bomb production, have been cancelled in whole or in part, Chrysler Corp. reports. The cancellation will affect more than 90,000 employees engaged in war work in Chrysler plants including about 42,000 in out of town plants.

Stainless "jewels" Make RADIOS Tick!

"FLIGHT SQUADRON 5 PROCEED . . ."

While a Navy radioman booms orders, life-or-death instructions to frontline fighters are going out from scores of other Army and Navy transmitters in the same area. The question is, "What prevents 'crossed wires'?"

STAINLESS ELECTRODES

The heart of it all is a tissue-thin quartz crystal that controls radio frequencies to pin-point accuracy. It vibrates inside the electrodes. In many transmitters and receivers these electrodes are made of ARMCO Stainless Steels.

The rustless "housing" for the crystal is a marvel of precision. This electrode is 3/4-inch square and less than 1/16-inch thick. During fabricating an extremely shallow flat depression is forced into the center of the electrode by a circular punch which covers all but the four corners. This leaves little "feet" on the corners, which are given an optical grind—often until they are only .0002-inch high!

THEY WORK "FEET FIRST"

Next a crystal is placed between two ARMCO Stainless Steel electrodes, with the "feet" facing each other. Then the edges are sealed. The hairline air-gap inside is just enough to permit vibration of the crystal — *on an unvarying frequency.*

There are many reasons why ARMCO Stainless is used for the electrodes. In salty atmosphere or in humid tropical areas these highly corrosion-resisting steels must be used. Rust or dirt inside the electrodes would garble vibrations —halt all communication.

OPTICAL DEAD-FLAT

Then, too, the steel must be smooth-surfaced and polished to what is known as optical dead-flat. Obviously, too, it must be non-magnetic.

If this precision equipment suggests new uses for ARMCO Stainless Steels in your future products, get in touch with us. We'll be glad to give you complete information. Just address The American Rolling Mill Co., 2651 Curtis St., Middletown, Ohio.

Export: The Armco International Corporation

STAINLESS ARMCO STEEL

SPECIAL-PURPOSE SHEET STEELS

THE AMERICAN ROLLING MILL COMPANY

PERSONALS

• **James Prendergast,** for 36 years the employ of the Sullivan Machinery Co., Claremont, N. H., has resigned, effective September 1, as superintendent of the foundry department of the plant. **Gardner G. MacLeay** will succeed Mr. Prendergast.

• **Morvin Thomas** has severed his connection with Pittsburgh Steel Co., Pittsburgh. For the past several years Mr. Thomas has been district sales manager in Chicago and previously was district sales manager in St. Louis.

• **C. T. Siebert, Jr.,** former manager of sales of the Lorain Products Div., Carnegie-Illinois Steel Corp., U. S. Steel subsidiary, Pittsburgh, has been appointed manager of sales of the new Specialty Products Div. of the corporation. Mr. Siebert has been with Carnegie-Illinois for more than 25 years and has served in a number of capacities in engineering, finance and sales. **James MacBeth, Jr.,** has become assistant manager of sales in charge of furnace products; **W. H. Friedline,** assistant manager of sales in charge of Lorain Products; **A. M. Harper,** manager of the Specialty Div. for the past 12 years, will remain with the Specialty Products Div. until September 1, when he plans to retire.

• **Fred Hoelzel** has been made product and sales engineer, Hupp Motor Car Corp., Cleveland and Detroit.

• **Richard W. Emmerling** has been elected a vice-president of Charles Dreifus Co., Philadelphia.

• **W. A. Redpath** and **R. C. Page** have been appointed assistant managers of sales, Joseph T. Ryerson & Son, Inc., Chicago.

• **Henry B. Ahlers** has been named an assistant on the staff of Ralph C. Stuart, vice-president in charge of the Lamp & Lighting Div. of Westinghouse Electric Corp., Bloomfield, N. J. **Dr. Albert Brann** has been named manager of the division's specifications and standards department, and **Paul B. Tully** has been appointed assistant manager of lamp manufacturing.

• **W. E. Osband** has been named organization manager of the Sales Div., Packard Motor Car Co., Detroit.

• **Charles Guernsey** has been elected a vice-president and manager of the Transit Equipment Div., Marmon-Herrington Co., Inc., Indianapolis.

• **James E. Thoms,** formerly sales manager for the Peerless Machine Co., Racine, Wis., has been appointed vice-president in charge of sales and general administration.

• **J. S. Murray** has been appointed Pittsburgh district manager for the Alliance Machine Co., Alliance, Ohio. He was formerly chief electrical engineer for Follansbee Steel Corp., where he had been employed since 1919.

C. T. SIEBERT, JR., manager of sales, Specialty Products Div., Carnegie-Illinois Steel Corp.

J. S. MURRAY, Pittsburgh district manager for the Alliance Machine Co.

LEON P. DISINGER, vice-president, Buckeye Brass & Mfg. Co.

• **Leon P. Disinger,** vice-president of Buckeye Brass & Mfg. Co., Cleveland, has been named vice-president and director of sales.

• **F. E. Williams** has been made general sales manager and **C. E. Sexauer,** service manager of the Zenith Carburetor Div., Bendix Aviation Corp., Detroit.

• **E. G. Cross** has been appointed supervisor of the production planning and control department of the Crocker-Wheeler Div., Joshua Hendy Iron Works, Ampere, N. J.

• **Dr. Otto Zmeskal** has been appointed director of research of the Bridgeville Div. of Universal-Cyclops Steel Corp., Bridgeville, Pa.

• **E. M. Schultheis,** in charge of automotive equipment sales in the Detroit office of Clark Equipment Co., Buchanan, Mich., has been appointed manager of automotive sales for the company with headquarters in Buchanan. **Leo A. Bixby** has been named manager of engineering for the Automotive Div. of the company.

• **C. S. Goddard** has resigned, after 27 years of service, as general sales manager of Goddard & Goddard Co., Detroit, and will move to the West Coast where he still will be connected with the company. **Stanley H. Grattan** has succeeded him as general sales manager of the company.

• **G. E. Jackson** has been appointed regional manager of Kelite Products, Inc., Los Angeles.

MILLIONS OF TONS of War Materials Have Been Handled Safely on

Northern CRANES

Throughout the gigantic war effort of American industry Northern Cranes have had an important share in carrying the load. Millions of tons of war materials have been handled safely on them.

Sturdy reliability which has characterized Northern Products for more than 40 years, has done a big war job—will be ready for a big peace job after V-Day.

Help Speed Victory
BUY BONDS

Northern ENGINEERING WORKS

Plant and General Office
2607 Atwater Street
DETROIT 7, MICH.

NORTHERN CRANE & HOIST WORKS, LIMITED
WINDSOR, CANADA

Offices in Principal Cities

• **Morton I. Dorfan** has been appointed manager of the Dust and Fume Engineering Div., American Foundry Equipment Co., Mishawaka, Ind.

• **Louis J. Chatten,** who resigned July 31 as director of the Radio & Radar Div. of WPB, has been appointed vice-president and general commercial manager, North American Philips Co., Inc., New York.

• **J. M. Failey** has been named New York assistant district manager of the Industrial Products Sales Div., B. F. Goodrich Co., Cleveland. **R. G. Cox** has been appointed manager of lathe cut, molded and extruded goods sales; **George J. Fischer,** manager of the hose department, and **Edgar T. Gregory,** operating manager.

• **James De Kiep** has been appointed chief engineer in charge of electrical and mechanical design and devlopment, Electric Machinery Mfg. Co., Minneapolis. Mr. De Kiep was formerly manager of the a-c motor engineering department at Westinghouse Electric Corp., East Pittsburgh.

• **N. A. Pedersen** has been elected president, C. B. Hunt & Son Co., Salem, Ohio, succeeding **N. C. Hunt,** who has retired. **S. C. Chessman,** who has been chief engineer at the plant since 1933, has been named vice-president and general manager.

• **Arden L. Knight** has been made eastern New England sales manager of the Braeburn Alloy Steel Corp., Braeburn, Pa.

• **Frank K. Ackerman** has been appointed product supervisor of the Equipment Dept., Electric Appliance Div., Westinghouse Electric Corp., Mansfield, Ohio.

• **Forrest H. Ramage** has been appointed assistant manager of sales, Pipe Div., Republic Steel Corp., Cleveland. He has been associated with Republic since 1926.

• **L. D. Whitescarver,** general assistant to the General Electric Co.'s sales manager of the Lynn turbine section, has been made manager of sales of the new Fitchburg section. **L. E. Newman,** Turbine Div., Schenectady, has succeeded Mr. Whitescarver at Lynn.

• **F. E. Smith** has recently joined the Vesuvius Crucible Co., Pittsburgh, as sales and service engineer. Mr. Smith was employed for the past 12 years by Republic Steel Corp. and Crucible Steel Co. of America, in both open hearth and electric steel production.

S. B. TAYLOR, president, Parker Appliance Co.

• **S. B. Taylor** has been elected president of Parker Appliance Co., Cleveland, succeeding **H. I. Markham,** who has been made chairman of the board of directors. Mr. Taylor was formerly manufacturing vice-president of the Reliance Electric & Engineering Co.

• **A. J. Zaber** has been appointed works manager, Gray Mills Co., Evanston, Ill.

• **Henry I. Guy,** assistant manager of the Transportation Div., Erie Works of General Electric Co., Schenectady, has retired after more than 40 years of service with the company.

• **Milton C. Angloch,** a director, member of the executive committee and vice-president of Jones & Laughlin Steel Corp., Pittsburgh, in charge of raw materials, has resigned, effective September 30, after 45 years service with the corporation. **Carl C. Henning,** who has been general metallurgist of the corporation, has been appointed manager of raw materials. **David T. Rogers,** formerly assistant metallurgist at the Otis Works of the corporation, has been appointed general metallurgist, succeeding Mr. Henning.

• **Henry F. Dever** has been elected president of the Brown Instrument Co., Philadelphia, a wholly-owned subsidiary of the Minneapolis-Honeywell Regulator Co., Minneapolis. Mr. Dever, formerly vice-president in charge of engineering for Minneapolis-Honeywell, has succeeded **Charles B. Sweatt,** who will now supervise the expanded sales activities of the Honeywell organization and its subsidiaries. **W. J. McGoldrick,** formerly vice-president of aeronautical engineering, will direct engineering activities of the parent company.

OBITUARY...

• **John B. Berryman,** 83, chairman of the board of the Crane Co., Chicago, since 1935, died Aug. 11. He had been associated with the company for 53 years, starting in 1892 in the Minneapolis office. He became manager of the engineering sales department, Chicago, in 1895, secretary of the company in 1911, first vice-president in 1914, and president in 1932.

• **George A. Green,** for 20 years until his retirement in 1932 assistant superintendent of the American Steel & Wire Co.'s North Works, Worcester, died recently.

• **Horace Burrough, III,** assistant general sales manager of the Merrimac Div., Monsanto Chemical Co., died Aug. 8.

• **Philip S. Graver,** 67, vice-president, Graver Tank & Mfg. Co., East Chicago, Ind, died Aug. 12 following a heart attack. He had been associated with the company for 50 years.

• **Timothy J. Feeney,** 61, president of the New Process Twist Drill Co., Taunton, Mass., died Aug. 10.

• **Michael J. Sasgen,** founder and the president of both Sasgen Derrick Co. and Grand Specialties Co., Chicago, died recently. He was 72 years old.

• **Warren Crampton,** 69, who for more than 39 years was manager of sales of the Baltimore office of Lukens Steel Co. and subsidiaries, By-Products Steel Corp. and Lukenweld, Inc., Coatesville, Pa., died Aug. 9.

• **William M. Cawthra,** manager of the pattern department, Acme Pattern & Machine Co., Buffalo, died Aug. 5. He was 56 years old.

• **Neil I. McArthur,** vice-president of Great Lakes Foundry Sand Co., Detroit, died recently.

• **F. Archer Thompson,** 62, head of the Detroit office of the Bullard Co., Bridgeport, Conn., died recently.

• **Thomas R. Akin,** president of the Laclede Steel Co., St. Louis, died recently at his home in Clayton, Mo.

SUN TABLEWAY LUBRICANT...

Prevents Scoring on Tableways, Overcomes Messy Overflow

A big machine-tool builder had always used either heavy cylinder-oils or mixtures of oil and graphite for the tableways of his surface-grinders.

Bearing-pressures on the ways were severe, and heavy compounded oils were tried to prevent scoring. They didn't. The heavy oils failed to return quickly to the sump, overflowed to the floors around the machines, invited slipping, and increased the possibility of accidents.

Lubricant often separated, producing film-failure, chattering, and scoring of the tableways.

In his own shops, testing the new Sun Tableway Lubricant, this manufacturer proved to his own satisfaction that he achieved better protection, greater precision, plus improved pumpability of the oil. Manufacturing-standards were improved. Dirty conditions were eliminated.

Developed in cooperation with machine-tool builders, Sun Tableway Lubricant is typical of the Sun industrial products that help save money, speed-up production. If your heavy machines are chattering, if tables are floating on heavy oils, or scoring because of thin oils, call the Sun man near you, or write to

SUN OIL COMPANY • ***Philadelphia 3, Pa.***

Sponsors of the Sunoco News Voice of the Air—Lowell Thomas

SUNOCO **SUN INDUSTRIAL PRODUCTS**

OILS FOR AMERICAN INDUSTRY

Dear Editor:

RUST PREVENTIVES

Sir:

Please send us five copies of "Specifying Rust Preventives," from the June 7 issue.

A. D. JOHNSON,
Technical Service
E. I. du Pont de Nemours & Co.,
Wilmington 98, Del.

● Tear-sheets mailed.—Ed.

1939 STEEL PRICES

Sir:

We no longer have our 1939 issues of THE IRON AGE and therefore ask you to provide price information for HR, CR, and galvanized sheets, black lapweld pipe, machine and stove bolts, and structural shapes.

J. W. KINNEY,
Purchasing Agent
The American Laundry Machinery Co.,
Cincinnati 12

● The requested prices have been furnished.—Ed.

PRECISION CASTING

Sir:

I was very much interested in the article on "Precision Casting of Low Alloy Steel," by Capt. Lester Gott, and hesitate to destroy the magazine by tearing out your article, since it is passed around throughout our organization. Would it be possible to obtain two sets of tear sheets of this article?

E. J. BASCH,
Research Engineer
Doehler-Jarvis Corp.,
Pottstown, Pa.

● Tear-sheets mailed.—Ed.

THE COMPETITIVE SPIRIT

Sir:

The editorial by J. H. Van Deventer in the June 14 issue hits a salient point, and we would like to bring it to the attention of others. The writer is wondering if reprints are available?

C. H. ARMSTRONG
Adamson United Co.,
Akron 4, Ohio

● Please let us know how many are needed and perhaps tear sheets can be sent.—Ed.

FORGINGS COMPETITION

Sir:

We are negotiating for the purchase of a drop forge plant and are presently investigating the future of a business of this type. It has been suggested that a process of using powdered metal has been or is being developed which might conceivably eliminate drop forging.

EMIL HEIMAN,
Treasurer
Robert Jacob, Inc.,
City Island 64, N. Y.

● The process of making machine parts out of powdered metals by compression and sintering has been suggested as one which might well capture certain markets now reserved to drop forgings. However, recently sentiment in the metal industry has changed somewhat and, while it is recognized that powder metallurgy technology is an important development, it is generally believed that established techniques of metal fabrication should not be seriously retarded by this process.—Ed.

FURNACE TEMPERATURES

Sir:

Due to the fact that you in the United States generally think in terms of Fahrenheit whereas in this country we usually think in terms of Centigrade, the article on "Pressure Sensitive Control of Furnace Dampers" from the issue of July 12 contains a slight error. It would appear that the figures in column 3 of the article have been quoted by us in degrees Centigrade but transcribed by you in degrees Fahrenheit. It is most important to correct these figures since the furnace shown would be unsuitable for the temperature range implied.

J. HANNING,
Export Department
Incandescent Heat Co., Ltd.,
Birmingham, England

● We regret this error.—Ed.

BRIQUETTING MACHINERY

Sir:

I am interested in the construction of a plant to briquet anthracite river coal dirt, and would like to get as much data as possible from manufacturers of briquetting machines and parties that furnish the binding tar or pitch.

EDGAR A. WEIMAR, SR.,
Consulting Engineer
2029 N. 2nd St.,
Harrisburg, Pa.

● A list of several manufacturers of briquetting machines has been mailed. They should be able to provide information on sources of binding tar and pitch.—Ed.

METALLIC ETCH

Sir:

Can you direct me to any publication on the procedure for electro etching of steels?

ETHEL A. SHIELDS,
Librarian
Eastman Kodak Co.,
Rochester 4, N. Y.

● There is no publication dealing with the electrolytic etching of steels. However, we expect to publish an article reviewing the subject in the latter part of August. There was an article on electro etching tools for identification in the Nov. 30, 1944, issue.—Ed.

"NE" STEELS

Sir:

We should greatly appreciate a list of NE Steel standard compositions. We find it difficult to check price variations with our similar steels as we have data for only a few of the qualities.

H. HICKS,
Managing Director
Sheffield Forge & Rolling Mills Co., Ltd.,
Sheffield 3, England

● We are sending the list of NE steel compositions which was published on May 6, 1943.—Ed.

PREFABRICATED HOUSING

Sir:

A few months ago you published an article on prefabricated houses, both steel and wood. I seem to have mislaid my copy which carried this article. I wonder if you would let me know the date of the issue or perhaps could send a tear sheet containing the article.

JOHN P. KELLY
P.O. Box 3, Station D.,
Buffalo 10, N. Y.

● We are sending tear sheets of "Postwar Prospects Rouse Prefabricated Housing" from the Oct. 5, 1944, issue.—Ed.

COLORING METAL

Sir:

A recent issue described an article on coloring steel parts employing dyes. Wire back collect name of company and send tear sheets.

HANS BERGER,
Chief Chemist
Stewart Warner Corp.,
Chicago, Ill.

● We are sending a reprint of the article "Iridite Treatment for Plated Parts." Rheem Research Products, Inc., Baltimore, is the manufacturer.—Ed.

WIRE CONSUMPTION

Sir:

We believe that in 1934 you published a table showing the distribution of steel and wire tonnages by states for that year. If a copy is still available, would you please send it to us Also, if there are any statistics available for more recent years, would you send them along to us?

H. DAVIS,
Manager, Market Research Dept.
Wickwire Spencer Steel Co.
New York 18

● Perhaps you refer to our condensation of much of the material that appeared in the report of the National Recovery Administration on the operation of the basing point system in the iron and steel industry which was issued Nov. 30, 1934. This report shows steel and wire production by areas. It does not show consumption by areas and we do not think area consumption statistics have ever been published.—Ed.

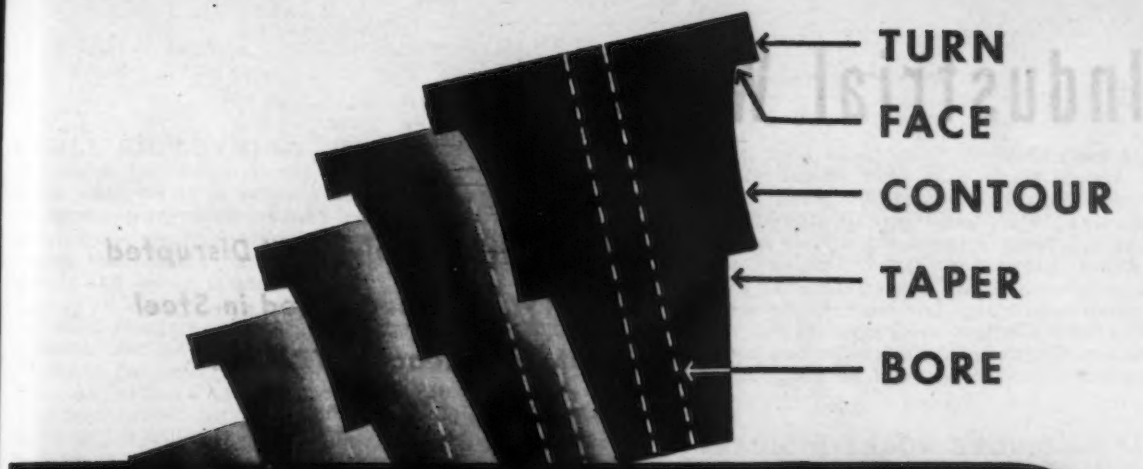
TOOL STEELS

Sir:

In the Jan. 30 issue a "Chart of Comparable Tool Steels" contained a notation that the charts supplemented the directory of "1500 Tool Steels" published serially and was available in booklet form. Please advise whether this booklet is still available and the cost thereof.

M. L. FAHRMANN,
Materials Engineer
Standard Oil Co. of Calif.,
El Segundo, Calif.

● Copies of the "Chart of Comparable Tool Steels" are available at 15c. The Tool Steel Directory costs $1.00 a copy, but the chart is furnished with the directory at no additional charge.—Ed.



PERFECT DUPLICATION

in one quick setup

...tomorrow or a year from tomorrow

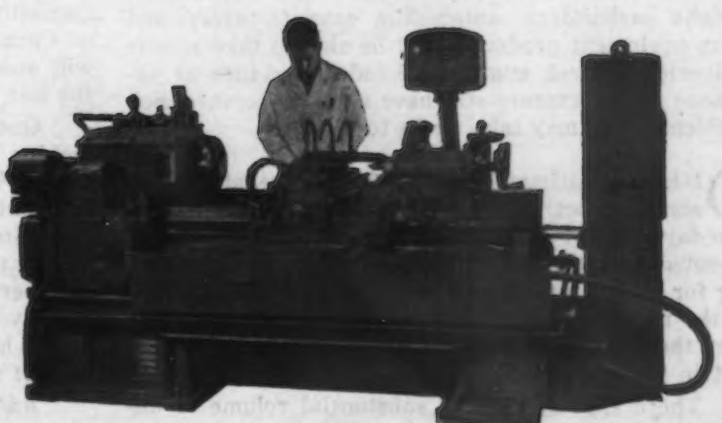
Setup to produce a job like this, involving straight, contour and taper turning, as well as facing and boring, can be made in a few minutes on a Monarch Magnamatic. Once set up, production is 100% automatic, permitting running of even small quantities economically, quickly and with precision.

The thin metal template which guides the tool can be stored in a small space, ready for perfect duplication of the work tomorrow or a year from now. Thus, short or long runs can be made at any time with the same precision and low cost as original runs.

The value of Monarch Magnamatics has been proved for a decade, in peacetime as well as wartime work. Since its introduction 10 years ago, we've made many improvements. Ask our representatives for details on how you can profitably use this fully automatic, all-electrically controlled machine for war production or for peacetime operation.

THE MONARCH MACHINE TOOL COMPANY • SIDNEY, OHIO

Monarch Saves Time



DIRECT FACTORY BRANCHES

CHICAGO 6, ILLINOIS
622 W. Washington Blvd.
Phone: Randolph 4295

DETROIT 2, MICHIGAN
801 Fisher Building
Phone: Trinity 1-0426

NEWARK 2, NEW JERSEY
635 Industrial Office Bldg.
Phone: Mitchell 2-1770

CLEVELAND 6, OHIO
Room 209 Upper Carnegie Bldg.
10465 Carnegie Avenue
Phone: Garfield 2590

INDIANAPOLIS, INDIANA
Maco Building
38 and College Avenue
Phone: Wabash 2650

PITTSBURGH 22, PENNSYLVANIA
512 Empire Building
Liberty Ave. and Stanwix St.
Phone: Atlantic 6428

Representatives in Principal Cities

This Industrial Week . . .

- **Steel Mill Schedules Still Disrupted**
- **40 Hr Week Inaugurated in Steel**
- **Ingot Rate Reaches 72.5 Pct**

THE steel industry this week was still attempting to bring a semblance of order out of the temporary chaos in steel mill schedules occasioned by war contract cancellations, many of which have not yet reached the mill level. That it may take some time before steel activity gets back to normal seems to be apparent. This is especially true because of the slowness in war contract cancellations in affecting mill books.

Cancellations of steel orders on mill schedules have not been as rapid as anticipated. Consequently, there are still many orders on the books which will eventually be cancelled and until such time as this takes place, complete reconversion of the steel industry to peacetime operation will be hindered.

Steel shipments so far this month compare favorably with last month's volume and in many cases shipments are still behind orders. One steel firm during the first half of August booked about 130,000 tons more than it shipped. Most of this business is firm regardless of war contract cancellations.

Steel operations in the primary departments suffered a substantial set-back last week with a revised steel ingot figure estimated at 65 pct. Raw steel output this week is estimated at 72.5 pct. It is not expected that these lower rates will prevail for any long period. As soon as steel companies have been able to clear their books sufficiently of cancelled business and substitute a peacetime schedule, a higher ingot rate can be expected.

There is some concern that many consuming industries will not be immediately able to take steel in quantities which would warrant a high level of operations at steel mills. While the railroads, warehouses, freight carbuilders, automobile manufacturers and farm equipment producers will be able to take sizable deliveries of steel, many other industries such as appliance manufacturers still have a major reconversion problem which may take weeks to solve.

ONE mill estimates that it had cancellations for about 10 pct of its rated orders during the first two days after V-J Day. The bulk of the tonnage represented by these cancellations involves material calling for August and September delivery. Cancellations at the mill level are expected to pour into steel mills over the next several weeks, which will make it difficult to set up economic rolling schedules.

There appears to be a substantial volume of unvalidated steel tonnage which mills can work on as quickly as schedules can be made. One mill reports it has confirmed orders which total 1,300,000 tons. Of this, 22 pct was for hot rolled sheets; 16 pct cold rolled sheets; 10 pct galvanized sheets; 14 pct bars; 7 pct plates; 4 pct structural; 4 pct strip steel, and 3 pct alloy steel. It appears that flat rolled requirements comprise about 60 pct of the firm orders on mill books.

Cold rolled sheet, tinplate and galvanized sheet tonnage so far have been relatively untouched by the flood of cancellations. Unless reshuffling of advanced schedules is done on the initiative of the mills themselves, steel buyers previously classified as unrated will not find their prospects for early delivery improved. That the mills themselves may take a hand in spreading out early deliveries scheduled for such consumers as warehouses, farm implement makers and railroads is within the realm of probability. Such action would allow civilian industries awaiting steel for their reconversion plans to secure steel sooner than if extended schedules were allowed to run their course. Some mills are said to be considering setting aside a portion of warehouse orders in order to serve the big civilian consumers directly in the belief that forcing these consumers to turn to warehouses for materials is no help to reconversion.

COMPETITIVE fences in the steel industry are being repaired and there is an apparent eagerness to catch the big-time buyers. Until some order, however, comes out of the present steel schedule problem, the large flat rolled consuming industries will continue to be faced with no tangible prospects for earlier than October delivery.

The Canadian steel industry is going through much the same production pattern as American mills. Heavy cancellations of war contracts in Canada will release substantial steel tonnages for civilian use. Cancelling of war orders will have little or no effect on Canadian steel mill bookings, since civilian demand will absorb all the slack which may develop through the loss of war business.

One of the first steps in prospect to reduce steelmaking costs in American steel mills is the resumption of the 40 hr week, thus avoiding heavy overtime payments engendered by the longer wartime turns. U. S. Steel Corp. has already inaugurated a 40 hr week and is putting it into effect as rapidly as conditions will permit. It is expected that this change will be effective at other mills before Sept. 1 and some companies have indicated that they would make the change even if the production rate suffered.

Another note of interest in the West Coast steel picture was raised this week when the Kaiser Co. had its government loan revised. The original loan of $111,000,000 has been scaled down to $69,000,000 which includes a cash loan for postwar purposes of $11,000,000.

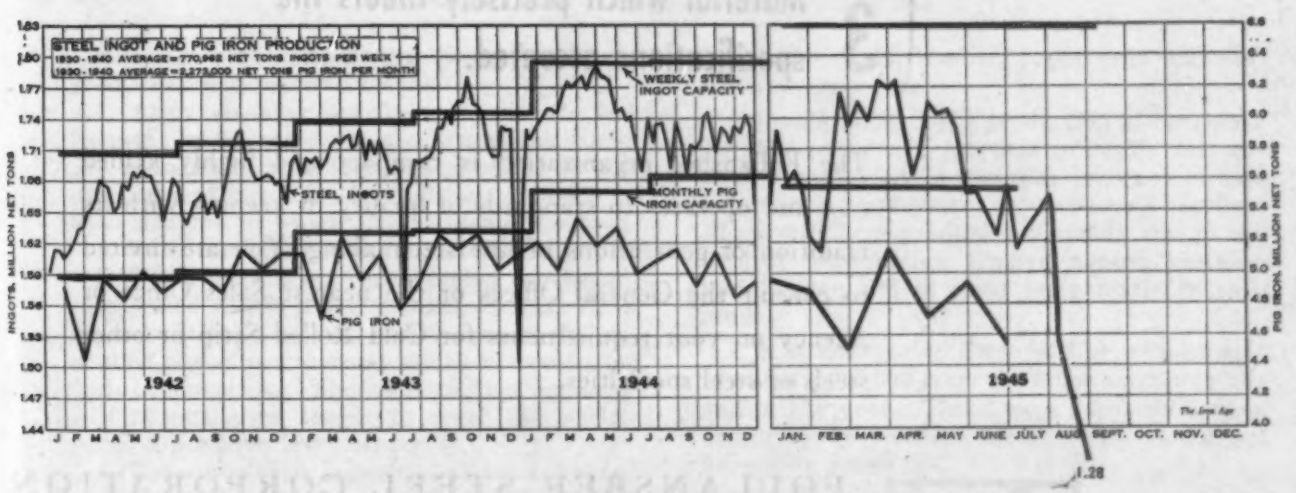
• **FULL EMPLOYMENT**—Much has been written and said about full employment, but very little has been said about what the term actually means. During the past war emergency there were workers in war plants that had never before been profitably employed; older workers were employed that should have been retired (and some actually were); and many younger people quit school to take advantage of high wages. From all indications, the full employment measures that are being considered by the government take all of these into consideration. Also, unemployment compensation takes all of these workers into its fold. As soon as these workers find themselves without jobs, application can be made for unemployment compensation and it will probably be paid. The potential danger of such plans and practices is obvious. Equally obvious is the fact that many of the border-line employees will never again be gainfully employed. However, because they were employed during the war, they are entitled to unemployment compensation totaling about $520 for the first 26 weeks of their idleness. With this fact in mind, unemployment is encouraged by making idleness profitable. Normally, there are only one or two actual breadwinners in a family. However, father, son, mother and daughter have worked in war plants. If father gets a full time postwar job, mother, daughter and son can nicely supplement that family income by about $1500 a year without moving out of the house. Why work?

• **NONFERROUS SCRAP**—Aluminum and copper scrap no longer has a market price as ingot producers are not interested in buying scrap at recent levels, which in the case of copper and copper alloy scrap was ceiling price, and in aluminum alloys was several cents per lb below ceilings. Ingot producers are not buying aluminum scrap at any price and will be glad to sell their own scrap stocks. Copper scrap would be purchased at this time by some ingot producers at approximately 2c per lb. below ceilings although there is no indication that holders of copper scrap purchased at ceiling prices would be eager to offer this scrap at such a considerable loss.

• **CANADIAN EXPORT PLANS**—Canada is preparing for a general step-up in export business and as a consequence the government has announced further easing in export regulations effective as of Aug 21. A new list of items which no longer require an export permit has been released from Ottawa. With only one or two minor exceptions the new list covers almost all items in the iron and steel, metals and chemical fields. In the iron and steel group the most important changes under the new regulations are the removal of permits for export to the British Empire and British Dominions, the United States, St. Pierre and Miquelon for the following: ingots, rails, alloy steels (except stainless steel), all other rolling mill products (except structural, tie plates, track materials, tin mill black plate); axes, dairy equipment and parts, electrical machinery apparatus and parts (except electric ranges over 25 amp, irons, radios, refrigerators, toasters, vacuum cleaners, washing machines); steam engines, hacksaw blades, hand and agricultural tools. The new regulation also removes from control a very wide range of iron and steel and rolling mill products, chemicals, etc., to Newfoundland, British West Indies, and St. Pierre and Miquelon.

• **PREDICTS LABOR TROUBLE**—The blistering attack launched by CIO President Philip Murray against John L. Lewis, chief of the United Mine Workers and Murray's predecessor as CIO president, foreshadows a violent outbreak of jurisdictional warfare between unions which will hurt the labor-management relations of hundreds of plants, A. C. Croft, president of the National Foremen's Institute, Inc., warns employers. Lewis' imminent return to the AFL, from which the U.M.W. and the other-than-CIO unions were expelled in 1937, is the immediate cause of Murray's assault against him, Mr. Croft said. CIO leaders fear, he declared, that once back in the AFL, Lewis will sparkplug a great drive to persuade not merely individual CIO members but CIO unions as a whole to desert Murray and "go AFL." "Unfortunately," Mr. Croft warned, "employers with CIO contracts will share the suffering of Murray and his aides. The intensified struggle between AFL and CIO for members will tear apart the relatively peaceful management-labor relations now enjoyed by many plants."

• **WHITHER SCRAP?**—Peace has caused no immediate reaction in scrap as had been anticipated by observers of the market. This seems largely due to anticipation of the end of the war, low scrap stocks in the hands of producers, consumers and dealers, and the prospective dwindling production of turnings as a result of shell contract cutbacks. Even with the prospect of a temporary lower steel operation rate, it seems that few if any important interests in the industry are willing to gamble on future market trends while all factors seem to point to a stable market in the immediate future. However, scattered reports from the districts indicate that some consumers are not continuing turnings contracts longer than their expiration date. This trend reverses the earlier eagerness for shipment of every kind of scrap regardless of the arrival of contract termination dates.



Steel Ingot Production by Districts and Per Cent of Capacity

Week of	Pittsburgh	Chicago	Youngstown	Philadelphia	Cleveland	Buffalo	Wheeling	South	Detroit	West	Ohio River	St. Louis	East	Aggregate
August 14.....	48.0*	39.0*	50.5*	65.0*	76.5*	93.0	60.0*	94.0	90.5	75.5	68.0	84.0	93.0	65.0*
August 21.....	59.0	80.5	55.5	89.0	78.5	71.0	80.0	94.0	83.0	63.0	83.0	84.0	93.5	72.5

* Revised

Snyder Report Admits Changes To Result in Temporary Unemployment

Washington

• • • Frankly declaring that the sudden termination of war contracts will cause a shock of considerable but temporary unemployment, Director John W. Snyder of the Office of War Mobilization and Reconversion, submitted a report entitled "From War To Peace—A Challenge" to President Truman on Aug. 15, one day after the Jap surrender. This is what is called the "Master Reconversion Plan." It answered some specific questions involved in the tremendous problem of reconversion. But so gigantic and intricate is the problem that OWMR could not foresee all of the complexities that lie ahead, much less cure all of the headaches that they will develop.

All will agree most earnestly with Mr. Snyder that it is a welcome swap to exchange lives which would have been lost in battle for sharp unemployment.

There is cordial agreement, too, with the determination not to continue the manufacture of a single shell, nor a single piece of equipment above absolute minimum military needs, for the purpose of reducing the shock of terminating war work. Actually, the War Mobilization and Reconversion Act prohibits such production simply to maintain employment.

Nevertheless, Washington and the public generally have the unemployment jitters. WMC Chairman Paul V. McNutt sees the possibility of 5,000,000 unemployed in the next six months, which may rise to 6,200,000 by the middle of December. The heaviest cuts by far were in Los Angeles and Detroit with more than 120,000 aircraft workers likely to be released in each area. Steel mill employment, he said, is nearly 50,000 less than it was two years ago, when output was about the same as it was on VJ-Day. Much of the post VE-Day adjustment had been made, it was pointed out, and continuation near the present activity rate should be expected. The WMC chairman anticipated that male workers who meet hiring standards would be taken back as fast as they become available now that manpower controls have been lifted and that the industry may abandon the 48-hr. week and return to the 40-hr. week.

While many labor demands are visible, Mr. McNutt said the extent to which workers shift depends in large part on the outlook for materials. He mentioned household items on which production has been held up because of lack of steel sheets and fractional horsepower motors. These and other component bottlenecks, he said, are now expected to unsnarl and he expressed the belief that these industries are on the verge of significant expansion in the next few months.

Mr. Snyder listed four major economic objectives that must be faced: 1. Jobs for all those willing and able to work. 2. A steadily rising standard of living. 3. Stabilization of our economy to avoid disastrous inflation or deflation. 4. Increased opportunities for farmers and businessmen.

Wherever immediate removal of controls will help to get expanded production underway faster, they will be lifted, Mr. Snyder said. They will be kept wherever their removal would bring a chaotic condition or cause bottlenecks or produce a disruptive scramble for goods.

Other things that must be done at once were set forth as follows: Plant and equipment, materials and manpower engaged in war production must be released by cancellation of all war contracts no longer needed. Terminated contracts must be promptly settled. Plants must be cleared. Armed services demobilized; prices kept in line until an abundant supply and sharpened competition can operate to prevent ruinous inflationary uses; wages held in line wherever increases would cause inflationary prices

. . . Production Cuts Summarized . . .

Here are highlights of the Snyder report on production and reconversion:

1. Army slashing purchase of aircraft and weapons by 95 to 100 pct, steel cancellations 99 pct, copper and aluminum cancellations 98 pct, procurement cut from $2.4 billions a month to $435 millions, of which $268 million is for food.

2. Navy cancellations total $9 billions.

3. While most plant reconversion can be accomplished within a few months, at least 12 to 18 months will be required to reach the expanded peacetime economy which is needed for full employment. The construction industry will require even longer to reach the anticipated $15 billion level necessary.

4. The automobile industry has been granted priority ratings for more than $150,000,000 worth of equipment, construction and tools. WPB will continue to give priority assistance where necessary in reconversion or plant expansion.

5. Rubber, tin, lumber, paper pulp and coal will remain scarce.

6. Employment in the production of consumer durable goods will increase promptly and expand rapidly. A substantial increase is also expected in employment in trades and services. There will be a gradual but steady rise in the field of construction, lumber, mining, clothing and leather and at least temporarily in railroads.

7. It is anticipated there will be withdrawals of about 2,000,000 from the labor market by the end of the year. There were 3,500,000 women employed who, except for the war, would not have been employed.

8. Most war plant workers are covered by state unemployment insurance. The Social Security Board reports that 30,000,000 workers will be entitled to unemployment compensation if they lose their jobs.

but measures taken to oppose shrinking purchasing power; strikes held to a minimum.

Mr. Snyder said that he has established a reconversion working committee of deputies from the executive agencies to insure that the full efforts of the government are thrown, as a team, into the task of formulating policies and plans for reconversion.

The OWMR head declared the country is not going back to long periods of mass unemployment, but that productive capacity will be put to work producing goods and services for peace.

In a question and answer section of his report, Mr. Snyder said that many production and distribution controls will be removed at once. Only those will remain in force which are essential for expediting production, breaking bottlenecks, preventing inventory hoarding and assuring economic stabilization. Rationing of certain scarce commodities such as tin must continue for a while. Wage and price increases will be allowed to correct substandard pay scales to relieve hardships of individual workers and enterprises and, where necessary, to stimulate increased production.

Legislative enactments recommended were: 1. Increased unemployment compensation benefits. 2. Revision of the Fair Standards Act to increase minimum wages. 3. Tax program to stimulate production and to maintain markets. 4. Appropriations for the planning and execution of public works. 5. Adequate appropriations for USES and retention of this service under federal control during the interim of transition.

210 WPB Industrial Controls Are Revoked; Others Under Board Review

Washington

• • • Revocation of 210 industrial controls, including 42 pertaining to the steel and metalworking industries, was announced by WPB on Aug. 21.

In line with stated reconversion policies which call for stepped up production of consumer goods, limitations on the number of radios, refrigerators, domestic stoves, electric fans and trucks were removed. Restrictions were also lifted on laundry equipment, metal furniture, steel shipping containers, machine tools, construction machinery, caskets, motorcycles and oil burning equipment.

The remaining 130 WPB controls are now under review, WPB Chairman Krug said, and a number of additional revocations are expected in a few days, including removal of restrictions on the number of automobiles that may be made this year.

Included among the announced revocations was Direction 75 to CMP regulation No. 1 which froze third quarter orders for certain types of steel sheet and strip and required reports on cancellations.

OTHER STEEL REVOCATIONS WERE:

L-88	Used rail and used rail joints.
L-211	National emergency specifications for steel products.
	Schedule 9, oil country tubular goods.
	Schedule 16, steel wire rope.
M-17	Pig iron.
M-21	Directions 5, 6, 7 and 8 only, iron and steel production.
M-21-I	Malleable iron castings.
M-24 and M-24-B	Iron and steel scrap.

AUTOMOTIVE ORDERS REVOKED WERE: L-1-E, L-2, L-2-A, L-2-B, L-2-C, L-2-E, L-2-F, L-2-H.

BUILDING MATERIALS ORDERS REVOKED:

L-157	Hand tools simplification.
	Schedule 8, wood boring bits.
L-236	Hardware simplification.
	Schedule 4, tackle blocks.

Construction machinery order No. L 192 was also revoked.

CONSUMER'S DURABLE GOODS:

L-5-C	Domestic mechanical refrigerators.
L-6	Domestic laundry equipment.
L-13-B	Metal furniture and fixtures.
L-23-B	Domestic electric ranges.
L-64	Caskets and burial vaults.
L-197	Steel shipping drum order.
M-9	Copper order.

REVOKED PLUMBING AND HEATING ORDERS:

L-23-C	Domestic cooking appliances and domestic heating stoves.
L-42	Plumbing and heating, Schedule 4, cast iron soil pipe and fittings.
L-248	Commercial dish washers.
L-349	Oil burning equipment.

TIN, LEAD, AND ZINC ORDERS:

M-11	Slab zinc.
M-11-A	Zinc oxide.
M-65	Cadmium.
M-72	Lead and tin scrap.
M-276	Bismuth.

TOOL ORDERS:

E-1-B	Machine tools.
E-6	Hand service tools.
E-10	Antifriction bearings.
L-302	Chain.

Green Light on Anti-Trust Suits

Washington

• • • Attorney General Tom C. Clark announced on Aug. 21 that the War and Navy Departments had withdrawn all requests for postponement of anti-trust suits made because firms involved were engaged in the war effort. The action releases twenty-five cases to the Anti-trust Division of the Department of Justice for prosecution.

Included among cases to be reopened are those against the Allegheny-Ludlum Steel Corp. (stainless steel), American Brass Co. (flexible metal hose & tubing), Association of American Railroads, General Electric Co., Fried. Krupp (tungsten carbide), General Electric Co. (fluorescent lamps and incandescent lamps).

Lend Lease Assistance Terminated

Washington

• • • Termination of lend lease assistance was announced by President Truman on Aug. 21.

Lend lease shipments to all countries have been suspended, the President said, pointing out that notification had been sent to the allied governments involved.

Materials will be disposed of to foreign governments only on condition that they are willing to make payment for them or, secondly, if it would be in the best interests of the United States to dispose of such materials on any other basis.

Stockpiles abroad were evaluated at between one and one and a half billion, according to the announcement.

Kaiser Refining Plan For Fontana Sets Value at 58 Millions

Washington

• • • Indicating a clear-cut government desire to maintain an expanding postwar steel industry on the West Coast, RFC has announced an adjustment of the original Kaiser Co., Inc., loan of $111,805,000 which was made to construct the Fontana steel mill including a new loan of $11,500,000 for improvements and additions at Fontana.

The RFC statement said the additional money was being advanced so that the plant "may be converted to civilian production and continue its present high level employment."

An independent firm of steel industrial engineers recently made, for RFC, a survey of the entire property of Kaiser Co., Inc., which places the present-day reproduction cost of the plant at $63,000,000. Depreciation further reduces the present-day value to $58,000,000. Estimates of the industrial engineers indicate that with new improvements and additions the plant should earn, with efficient operation, after all costs, exclusive of depreciation and income taxes, about $5,000,000, if operating at 60 pct of capacity and about $6,600,000 if operating at 70 pct. Should the plant operate at between 80 pct and 100 pct earnings should rise to approximately $10,000,000.

The total indebtedness is to be revamped and RFC will take:

1. A 15-year 4 pct first mortgage of $69,500,000, which represents $58,000,000 sound value of the present fixed assets plus the new improvement and plant additions.

2. A 25-year second mortgage for $34,510,380, without interest, representing the balance of the original loan invested in fixed assets.

3. A $10,318,000 note secured by 103,180 shares of 4 pct first preferred stock of Kaiser Co., Inc., having a par value of $100 per share. Interest on the first mortgage loan and dividends on the preferred stock are payable during the first two years only to the extent earned.

All net profits received by Kaiser Co., Inc., from ship construction were originally pledged to RFC as additional security to the original loan and will continue as security to the revamped loans. Of the ship fees and profits received under contracts entered into prior to July 1, 1945, 72½ pct is to be applied to the principal of the second mortgage and, in addition, 25 pct of the earnings of the Steel Division of Kaiser Co., Inc., after interest, principal payments on the first mortgage and income taxes, but before depreciation, is also to be applied on the principal. The remaining 27½ pct of the ship construction fees and profits received is to be applied on the preferred stock note until paid, and thereafter on the first mortgage.

Kaiser Co., Inc., in addition to operating the Fontana steel plant, is building ships for the Maritime Commission. Approximately $14,000,000 has been received by RFC from Kaiser's ship construction profits of which $9,000,000 was applied to the principal of the original loan and the balance to interest.

Additional Navy Cuts Announced

Washington

• • • Stepping up its cutback rate the Navy Department has announced the termination and partial cancellation of 1,200 contracts for ordnance materials totaling $1,500,000,000. The contracts cancelled are largely for ammunition and were not scheduled for completion for many months.

The Navy also disclosed that approximately 1,600 other contracts totaling $1,100,000,000 will remain in effect, chiefly for research and development projects.

In addition, work will be continued on four of the eight warships which have been under construction at the Newport News Shipbuilding & Drydock Co., the carriers Midway, Coral Sea and Leyte and the cruiser Newport News.

Maritime Cancellations Detailed

Washington

• • • The Maritime Commission announced on Aug. 20 the cancellation of $425,000,000 in contracts covering construction of 135 ships and three contracts for special military equipment.

The contracts canceled cover 35 coastal cargo ships of the C1-M-AV1 type, 42 Victory cargo ships, 24 coastal tankers for lend lease to Great Britain, 4 Liberty's being converted to aircraft repair ships, 8 military type victorys, 8 tankers, 5 military transports of the C4, type, 6 refrigerator ships and 3 of the P2 type.

The three contracts covering special military equipment for the Navy accounts for $70,000,000 of the trade above total.

Special Scrap Committee Formed

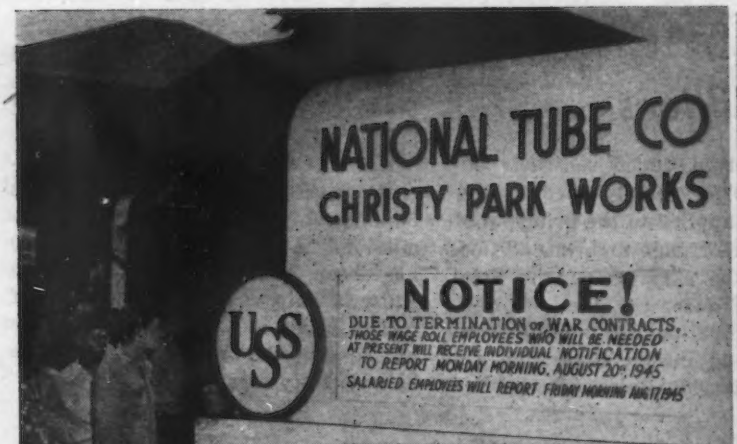
Washington

• • • Formation of a special Industry Advisory Committee to study and make recommendations on the disposal of ferrous and non-ferrous scrap, particularly that located overseas, was announced by the War Dept. Aug. 21.

This group of specialists which includes representatives of the steel, iron, aluminum and scrap industries, was formed at the request of Gen. Brehon Somervell, ASF director, and will concern itself initially with the problems of battlefield scrap and scrap equipment.

Among problems to be studied by the committee, the War Department said, are: 1. Whether scrap should be returned to the U. S. 2. Stockpiling abroad for later disposition. 3. Disposal of scrap overseas.

Other matters coming before the committee include the disposition of 200,000 tons of captured enemy ammunition and, also, large quantities of battery lead now located in the European Theatre.



Industry Wide Reconversion Problems Begin

Pittsburgh

• • • Following the two-day holiday proclaimed by President Truman, industry started looking around through the debris caused by war contract cancellations to see just how the operational situation lined up and how much of a working force it would need to go on with reconversion. The immediate employment picture looks bad, but industry is convinced that the reconversion will be quick and employment will be large. However, in finishing and fabricating industries, V-J Day saw employees laid off in large numbers, while the steel industry, as a whole, had few layoffs. Steel went to work last Friday.

The one notable exception was Carnegie-Illinois Steel Corp. a combination of a strike of service railroad employees plus the fact that the company had planned a workers' holiday through Saturday took this important producer completely out of production for the better part of last week, and 45,000 steel mill employees loafed from Wednesday through Sunday.

On Saturday, Carnegie announced that the strike, which had begun three days earlier, prevented resumption of operations at Saturday midnight, as planned. This resulted in no work Sunday at Irvin, Duquesne, Edgar Thomson, Clairton or Homestead. Bargaining rights seemed to be the disputed question. The Brotherhood of Locomotive Engineers and the Brotherhood of Firemen and Enginemen unions were represented on the National Mediation Board ballot for union selection this week, and CIO was excluded. Hostlers loyal to the CIO began the strike. The election began Friday and will continue to Tuesday this week.

Operations were resumed on Monday morning, when the strike ended and the railroad employees went back to work.

Meanwhile, the Pittsburgh Steel Co. has been tied up with a strike at its Allenport plant for more than a week, with about 2500 workers idle.

Most notable of the Pittsburgh companies where layoffs were heavy and permanent are the shell plants of Jones & Laughlin at McKeesport and National Tube Co., at Christy Park. Together these two plants last week permanently dismissed some 10,000 workers who will have to find work elsewhere.

Cutbacks in ordnance contracts alone in this district were valued at $300,000,000, involving about 125 companies. Only a few "research and development" contracts were continued, and most of these at reduced scales.

While Carnegie-Illinois plants were completely idle, other subsidiaries of U. S. Steel Corp. got back into operation last Friday. National Tube Co. went back into full operation in all plants except Christy Park, and American Steel & Wire Co.'s Pittsburgh operations got back into production. American Bridge Co., was back to normal operations, which, of course, are greatly reduced from what they were a year or so ago because all shipbuilding had been discontinued at that plant. H. C. Frick Coal & Coke Co. had all coal mines back in operation except three, which were National Nos. 1 and 3, and Bridgeport mines. C-I's Clairton work's coke plant was operating at about 25 pct, supplying gas for maintenance needs.

Jones & Laughlin went back to work on Friday, but absenteeism was reported to be high. A company spokesman stated that it would be Monday or Tuesday this week before all operations were back at normal.

Allegheny Ludlum resumed operations last Friday with no layoffs and none anticipated. Delay in consuming industries taking deliveries of steel will be the only holdup to Allegheny Ludlum returning to a high rate of operations.

Robertshaw Thermostat Co., of Youngwood, Pa., and its subsidiary, the Paragon Mfg. Co., with plants at Derry and Indiana, Pa., laid off about 2500 workers, half of the working force at these companies. Pullman Standard Car Mfg. Co., Butler, Pa., a heavy producer of large caliber shells, laid off about 500, or a quarter of its working force.

Many companies, especially those producing steel and foundries, are ready for war business right now. Many have not yet received cancellations of orders, but as soon as this detail is cleared up, civilian production can begin immediately. Superior Steel Corp. and Union Electric Steel Corp., both at Carnegie, reported they have already made the changeover to peacetime work. It is quite probable,

if this is true, that rated orders are at a minimum on their books and that they expect immediate cancellation of any they are now holding. Steel mills report that cancellations were not immediately forthcoming, and it was for the purpose of going through mill schedules and order books to see what orders were firm that Carnegie-Illinois decided on a complete shut down of operations until last Saturday midnight.

• • • **Early this week** from 70,000 to 80,000 Chicago war plant workers had been laid off temporarily or permanently with a prospect that temporary layoffs may swell to over 400,000 within the next few weeks. A large portion of the workers laid off are women.

Permanent discharge was given to 15,000 of the 30,000 workers at the Dodge Chicago plant of Chrysler Corp., maker of B-29 bomber engines. The balance of the staff will be let out as engines in process are completed. Douglas Aircraft Corp. at Park Ridge laid off 3300 and plans to retain 14,000 more workers for as much as three months including aircraft now under construction. Buick Aircraft at Melrose Park made an initial termination of 2500 with 7700 more to go in three weeks when the aircraft engine plant shuts down.

The Gas Mask Div. of Johnson & Johnson, in releasing more than 750 workers carried newspaper display advertisements recommending their employees to peacetime employers and highlighting their performance record. The company sent a four-page broadside to 1400 metropolitan Chicago employers and 600 officers and directors of national banks describing worker personnel and their job classifications. Each employee is supplied with a work experience record designed to influence him to seek the kind of work to which he is suited.

• • • **Immediate unemployment** in the metal working industries will be the problem in the Cleveland area. With Ordnance contract cancellations alone totaling upwards of $350,000,000 involving some 325 companies in the Cleveland Ordnance District, Friday morning employees reporting for work were met with a universal "Shop closed until further notice." Plants hit by the contract cancellations included practically all of the Cleveland industries and the period of reconversion was estimated from two days to two months.

The picture as a whole in this area is not too good. Because of the fact that the bulk of Cleveland district industry is in the finishing or fabricating end of the metal working business, many layoffs will prove to be permanent. One company that was engaged primarily in the production of aircraft products estimates that its peacetime conversion, which will take about 90 days, will result in the permanent dismissal of about 1500 employees, 20 pct of which are women.

Jack & Heintz, Inc., well known because of its fabulous expansion during the war, laid off its complete staff of some 6000 employees over the past weekend, with the expectation of rehiring about 2500 within the coming two weeks. Ever-optimistic William S. Jack president of the company, stated, however, that within a year following VJ-Day, Jahco would be able to boast of a personnel list totaling 15,000.

Thompson Products Co., Inc., expects substantial layoffs.

• • • **The war's end** is expected to result in a 20 pct employment drop in the Birmingham District from the peak wartime level with about 40 pct of that total regained when reconversion has been accomplished.

If that estimate by industrial sources holds up, post-reconversion employment here will be substantially above the average prewar year mark. Most plants that will have to reconvert are expected to be able to make the shift in three months or possibly less.

First casualties to shutdown in this state were government-owned ordnance plants such as Alabama Ordnance Works, Childersburg, where 6500 workers were employed when the Japanese surrendered.

Also closed—but only temporarily—is the Birmingham plant of the Rheem Manufacturing Co. which had been working solely on war contracts. At the time of the Jap capitulation 1400 persons were working there.

Still operating is the big Bechtel-McCone airplane modification center here where 5500 planes, including B-29's, have been modified.

Although $200,000,000 in war contracts were cancelled in the five state Birmingham Ordnance District, a number of plants in the immediate Birmingham area have not been hit as hard as might be expected for their war contracts called for the same products that can be used by civilian trade.

In only a minor way, for example, does the close of hostilities affect the Tennessee Coal, Iron & Railroad Co.—the South's biggest steel producer—and the Gadsden operations of Republic Steel Corp.

For example, Robert Gregg, president of the Tennessee Company, pointed out on Aug. 16 that his company "will have virtually no problems of reconversion."

• • • **The declaration** of peace in the Pacific has opened a new picture for the Canadian iron and steel industry, a change that will result in a very broad swing from war to peace activities in all plants of the Dominion. Already extensive cancellations and cutbacks have been announced in war contracts and others are following in rapid succession. It was announced from Ottawa recently that upwards of 90 pct of the war contracts placed by the United States with Canadian firms have been canceled and large cancellation of Canadian and British orders also have gone into effect. Thousands of workers are being released from Canadian war plants on a week's notice, but it is stated in government circles that jobs are available for more persons than will be let out in the next few months.

The first announcements of heavy lay-off of workers in Canadian war plants came on Aug. 17 and others are pending and expected to follow almost immediately.

Dominion Bridge Co., Toronto, notified approximately 850 employees their jobs would be finished in seven days.

Canadian Car & Foundry Co., officials announced that 3000 employees of its Fort William plant were being laid off, owing to termination of aircraft contracts. The company has been making Curtiss Hell Diver aircraft for the U. S. Navy. W. O. Will, plant manager, stated that between 1500 and 2000 employees will be continued on the payroll until Christmas on bus construction and taking of inventories. During 1946 about 1200 employees will be working at the plant on construction of busses.

Two large Chatham plants, Chrysler Corp. and Ontario Steel Products, will lay off a large number of workers, starting immediately. Officials of Chrysler Corp., stated that the layoffs will be permanent to a large extent, and J. H. Wilson of Ontario Steel Products, stated that employees would be put on a short week

In Vancouver approximately 2500 workers have been laid off by shipbuilding plants, and the Boeing Aircraft Co., has started laying off 300 aircraft workers and the two shipyards controlled by Yarrows Ltd., in Victoria have laid off 700 workers.

Atomic Bomb Sidelights . . .

(Abstracted and correlated from official data)

• For well over 100 years the two cornerstones of modern science have been (1) matter can be neither created nor destroyed but only altered in form (law of conservation of mass), and (2) energy can be neither created nor destroyed but only altered in form (law of conservation of energy).

• Up to some five years ago these two laws were unaltered and separate. Now it is obvious they are, in fact, two phases of a single principle, i.e., energy may sometimes be converted into matter and matter into energy. Such conversion occurs in nuclear fission of uranium, wherein atomic nuclei split into fragments with the release of an enormous amount of energy.

• Einstein, away back in 1905, stated that mass and energy were equivalent and suggested that proof of this would come from radioactive substances. He concluded that amount of energy, E, equivalent to a mass, m, was given by the equation $E = mc^2$, where c is the velocity of light.

• Stated in actual numbers, Einstein's prophecy was startling; for 1 kg (2.2 lb) of matter, if converted entirely into energy, would give 25 billion kwhr of energy. This is equal to the total electrical generating capacity of U. S. for 2 months. This fantastic figure may be compared with 8.5 kwhr of heat energy produced by burning 2.2 lb of coal.

• For years this conversion factor opened wide fields of speculation, and comic strip artists had a field day with the possibilities. But only since 1930 was technical evidence forthcoming to prove such a relationship sound.

• All matter is made up of different atomic arrangements. Every atom consists of a small heavy nucleus surrounded by a largely empty space in which electrons move somewhat like planets about the sun. The nucleus carries an integral number of positive charges and each electron carries one negative charge, the total electron charge equalling the nuclear positive charge, thus giving the atom a net charge of zero. By 1932 it was determined that all nuclei are made up of neutrons and protons, the former carrying no electrical charge whatsoever.

• If the nucleus of an atom can be disturbed, the atom will rearrange itself into other stable forms in the course of which in certain instances large quantities of radiation and heat energy are released. The neutron itself was found to be the most effective bombardment agent to penetrate the electron screen of the atom and by occasional hits on nuclei knock out protons or other neutrons and thereby induce an atomic rearrangement with consequent release of radiation (radioactively) and heat energy.

• The discovery of sources of neutrons and success in controlling neutrons in breaking down other atoms is the whole theme song of atomic disintegration.

• Theoretically, any atom could be broken down by a neutron impact on its nucleus, and many experiments in the 1930's showed this to be the case, although most atoms are so stable that artificial nuclear disintegration by neutron bombardment is spotty and extremely difficult. Furthermore, none were of the self-multiplying chain type, that is, changes could be produced by neutron bombardment, but the disintegration did not produce new neutrons to propagate further disintegrations.

• In 1939 German experiments indicated that the uranium nucleus when bombarded by neutrons would break down into two unstable parts, and these parts would emit a few new neutrons and decay radioactively (similar to but far faster than the decay of natural radium over the decades into lead, emitting all the time destructive radiation) until the two parts form stable nuclei (krypton and barium). This process was called atomic fission, and herein lay all the prerequisites of atomic power or bombs, i.e., once started by a neutron bombardment there occurred a large energy release along with release of new neutrons to break down additional uranium in a chain fission propagating itself as long as uranium is present.

• At this time (1939-40) the flow of foreign physicists to this country (primarily) from Germany, carrying the startling idea of uranium fission, found a few American physicists developing complementary data. It was primarily the foreign-born physicists who stimulated a self-imposed censorship on publication of further experimental discoveries, and encouraged the Navy to put up a little money and show a certain degree of formal interest. Not long thereafter the various experiments came under a newly created control designated as the Manhattan District.

• It had been shown by 1940 that natural uranium ore contains three different type of uranium (isotopes, i.e., identical chemically but different atomic masses), and the three uraniums were called U-234, U-235 and U-238. It soon was shown that U-235 had the highest probability of undergoing fission when hit by a neutron, but unfortunately the high-speed neutrons emitted during fission were absorbed without fission by the U-238 which changed into U-239, an unstable material which decayed radioactively into element No. 94, later christened plutonium, or those not absorbed would not produce fission in the remaining U-235 because of their very high speed.

• Then about this time independent work at the University of California rolled in which indicated that this new element plutonium would under go neutron fission just like U-235, *only more so.*

• All this seemed pretty complicated, but the problem broke down somewhat in this manner:

(1) Devise some means of separating U-235 from U-238 in the uranium ore, a most difficult problem in view of their chemical identity and because U-235 is present in the ore in only one part in 140.

(2) Devise some means to slow down the neutrons from initial fission of the U-235 in uranium ore so that those not captured by the U-238 could possibly result in fission of additional U-235, thereby creating a chain reaction or fission.

(3) Producing large quantities of the new element plutonium which would be as good or better than U-235 for chain-fission purposes.

• Consider (1), that is, the separation of U-235 from U-238. To separate these two isotopes was possible

by a newly devised gaseous diffusion system or by a suggested centrifuge system. In either case such equipment would cost many tens of millions of dollars and cover innumerable acres of ground (22,000 separately driven, extremely high speed centrifuges, for instance,) to separate 1 kg of U-235 a day.

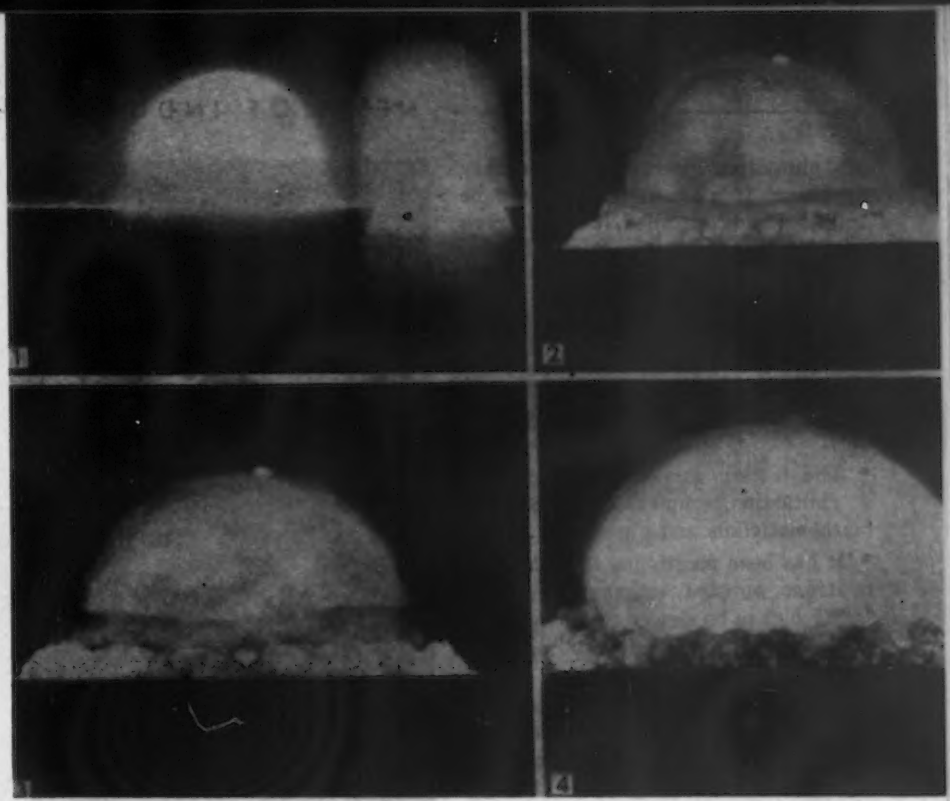
• The gaseous diffusion plant was favored here and in England, and many preliminary and pilot units were constructed over several years. Innumerable companies were involved —M. W. Kellogg Co., J. A. Jones Construction Co., Carbide & Carbon Chemicals Corp., Bell Telephone Laboratories, Bakelite Corp., Houdaille-Hershey Corp., Hooker Electrochemical Co., E. I. du Pont Co., Harshaw Chemical Co., and many others.

• Finally, in mid-1943 construction of a full-size diffusion plant was started in one of three valleys in the Tennessee Valley at what was known officially as the Clinton Engineering Works, which covered some 70 sq miles on the Clinch River some 30 miles from Knoxville, and where the bulk of all production work on atomic bomb materials was later concentrated. The process requires tremendous quantities of steam and one of the largest steam plants ever built was put up at Clinton. Before the summer of 1945 this diffusion plant, albeit very complicated, costly, and of very large size, was successfully concentrating U-235 from uranium ore.

• In 1941 work at the University of California indicated that U-235 could be concentrated from uranium ore by magnetic means. Eventually this magnetic method became by far the most promising. The 37-in magnet of the cyclotron in California was first used to produce the magnetic field in a pilot operation, and the arrangement was called a calutron (California Institute cyclotron). Here again there was a tremendous volume of exploratory and associated experimental work involving many individuals and companies.

• The Rockefeller Foundation had several years before started to build a well-publicized giant cyclotron at the University of California, and by May 1942 this 72-in. (pole diameter 184 in., pole gap 72 in.) giant magnet was being used for further experimental separation of U-235.

• Construction of the first series of electromagnetic separation units (sizes unknown) was begun in the second of the three valleys at Clinton in March 1942, and this part of the plant was ready for operation in November 1943. Westinghouse, General Electric, Allis-Chalmers, Stone & Webster Engineering Co., and Tennessee Eastman Co. were all involved in these design and construction efforts.



• One infinitesimal neutron activated some 400 lb of U-235 or plutonium to create this cataclysm viewed from a distance of 6 miles. The reaction is inefficient (relatively, of course) as complete fission of only 2 lb of the U-235 would give the same effect.

• During all this time still another separation technique, a thermal diffusion method, had been showing experimental promise at the Naval Research Laboratory. Finally a large scale unit was built at Clinton, being completed very quickly and in operation by late summer of 1944. It used tremendous quantities of steam and could not be run at capacity because of steam needs of the gaseous-diffusion plant.

• Thus, there are three different units operating at Clinton for the separation of U-235 from uranium, (1) the gaseous-diffusion plant, (2) the magnetic-separation plant, and (3) the thermal-diffusion plant. In practice, both the gaseous and thermal-diffusion units carry out partial separations of U-235 from uranium, and this enriched product was fed through the very efficient electromagnetic unit for final and complete separation of practically pure U-235.

• During the 1944-45 period of work on separation of U-235, spotty but constant success elsewhere was being achieved in the other two objectives, i.e. (2) creation of controllable chain fissions using uranium and a moderator, and (3) production of the new element plutonium. It was the continued encouragement in creating chain fissions that warranted the building of the U-235 separation units at Clinton, already described. Furthermore, the desire to obtain plutonium came from the possibility that the plutonium would be a more efficient fission material than U-235 or a possible material to use if large-scale (i.e. onzes) separation of U-235 from uranium proved impracticable.

• To repeat: An atom of uranium when broken down by a neutron broke into two unstable parts which decayed radioactively to two stable atoms (krypton and barium), releasing great heat energy and a few new neutrons to break down some more uranium, i.e., creating a chain of energy releases which if slow would be a power source or if fast would be an explosion. This process was dubbed fission. The uranium ore was made up of three isotopes, U-234, U-235 and U-238. U-235 showed the greatest efficiency in fisson; hence the attempts to concentrate U-235 from uranium which have been described. The U-238 tended to interfere with the fission of U-235, and by capture of neutrons was transformed into U-239 which decayed radioactively to a new element plutonium. This plutonium in turn was fully as efficient at U-235 as a new fission product, and hence its production would be a desirable end objective.

• Therefore, the testing for a controllable chain fission and the production

of plutonium were complementary problems. If a chain fission could be initiated and controlled, it would prove (1) the feasibility of explosive fission, and (2) some of the U-238 in uranium would be changed to plutonium which could be separated from the uranium by relatively simple chemical means since the plutonium was a different element (i.e., not an isotope of uranium).

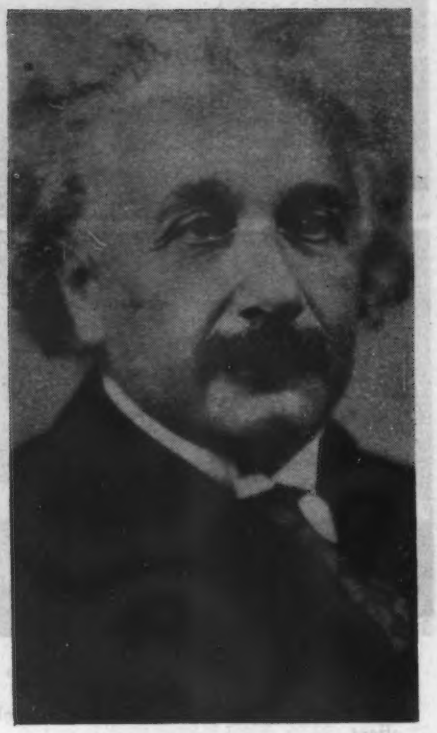
• The testing for chain fission was a fantastic technical triumph for mathematicians and physicists.

• It has been mentioned that the fast neutrons emitted by the fission of U-235 had to be slowed down by passing them through another material (a moderator) so their speed would be just right to break apart additional U-235 atom nuclei. The best moderators are hydrogen, heavy water (a laboratory-created isotope of water), beryllium and pure carbon (graphite).

• By 1941 espionage disclosed that the Germans in Norway had a plant producing several kilograms of heavy water daily, and that elsewhere paraffin was being made using heavy hydrogen. This indicated that the Germans were well along on the atomic-fission problem as these two materials were obvious moderators for a chain reaction. The British directed a Commando raid at this Norway plant while the U. S. was fervidly debating whether the Germans could get across an ocean if they couldn't get across the English channel.

• Allied physicists about this time came up with a German possibility even more benumbing than atomic explosives. In a chain reaction using uranium and a moderator the fission of the U-235 produces for the most part two unstable radioactive parts which ultimately stabilize into krypton and barium although as many other radioactive elements are formed in small amounts. These unstable radioactive substances could be separated from the uranium and during their radioactive decay could be dropped from aircraft as a particularly vicious form of radioactive poison. Only a little would be needed —the populace would not detect anything amiss—people in a large area would within a short time all develop what might best be described as galloping cancer.

• Even the U. S. military was so frightened by this relatively easily attainable possibility that by 1941 they were actively supporting the long-haired sharp-pencil physicists



ALBERT EINSTEIN

• In 1905 his mathematical prophecy was the original tip-off.

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(i.e. impractical college professors) and President Roosevelt was personally initialling questionable proposals involving hundreds of millions of dollars.

• Graphite was finally selected as a moderator. Experiment showed that the fission of U-235 in uranium by a slow neutron was attended by release of a few high-speed neutrons which on passing through 40 cm of graphite was slowed to a point to produce fission in additional U-235 of uranium. Suppose small pieces of uranium were to be distributed proper critical distances throughout a matrix of graphite, there being incorporated in the structure adequate cooling arrangements. Such a "pile" is made up of uranium, graphite, impurities, cooling system, etc. Given an outside trigger source of neutrons to creat fission in some uranium (U-235) and if 100 new neutrons are created by the fission, some will escape, some will be absorbed in the uranium without causing fission (i.e. by the U-238 to produce U-239 then plutonium), some will be absorbed in the carbon, in the cooling system or in impurities, and some will cause fission of additional U-235 thereby producing more neutrons.

• If enough of the new neutrons produce fission to produce new neutrons which in turn produce fission, the result is a chain reaction or fission either controllable or explosive.

• In 1941 just the securing of enough pure graphite and uranium for even a small pile was a serious problem indeed. Westinghouse, Metal Hydrides Co., Mallinckrodt Chemical Works, Harshaw Chemical Co., E. I. du Pont, Union Carbide & Carbon Corp., and Speer Graphite Co. all finally contributed to supply of proper materials.

• Several small piles were built at Columbia University, but the first successful chain-fission pile was constructed in Chicago, and on Dec. 2, 1942, for the first time in the world's history did human beings initiate a self-maintaining nuclear chain reaction. Initially the pile was operated at a power (i.e., heat dissipated) of ½ watt, but on Dec. 12 the power level was raised to 200 watts.

• The pile was an oblate spheroid flattened at the top (i.e., like a door knob). Uranium lumps were spaced in a cubic lattice imbedded in graphite. For construction the graphite was cut into bricks and laid up in layers, alternative ones of which contained lumps of uranium at the corners of the squares. The pile contained 12,400 lb of uranium. For control ten slots passed completely through the pile and in these slots were strips of cadmium or boron steel. These strips absorbed sufficient neutrons as to prevent chain-fission of the uranium lumps. As the strips were pulled out fission of uranium built up and heat energy was released. The final strip never was pulled out due to obvious radioactive danger to personnel in nearby buildings and likelihood of the pile destroying itself.

• This first successful pile was supported on a timber framework resting on the floor of a squash court under the West Stands of Stagg Field, Chicago.

• More graphite and uranium were becoming available and it was decided to build a larger pile. Furthermore, it was decided to have the uranium as rods instead of lumps in this new pile so that they could be continuously pushed out for recovery of plutonium, ease of control, etc. This resulted in another field day for mathematicians to figure the size of the rods, critical spacing in the graphite, change in spacing from the center of the pile outward, etc.

• Another group of scientists were working on methods to separate the few per cent of plutonium produced in the nuclear breakdown in the pile

from the uranium. By the end of 1942 chemists knew enough about plutonium, which had been entirely unknown 18 months earlier, to devise relatively (but only relatively) simple means of extracting it in practically pure form from the uranium from which it originated.

• It had been figured that an explosive atomic bomb would require not less than 4 lb and not more than 220 lb of plutonium (or U-235, separation of which from uranium was also being carried out during this period, as had been described). Therefore, a plutonium production rate of 2 lb a month to 2 lb a day was considered at this point. The first small chain-reaction pile, already described, would have produced insignificant plutonium. A reaction pile liberating from 15,000 to 45,000 kw of heat would turn out 1 oz of plutonium daily. To produce some 2 lb of plutonium daily would require a chain-fission pile giving off some 1,500,000 kw of heat energy daily (for comparison, consider that the ultimate capacity of Grand Coulee Dam will be 2,000,000 kw daily). Any chain-fission pile of this size would constitute atomic power on a Buck Roger's scale.

• To secure some plutonium quickly on air-cooled 1000-kw chain-reaction pile and a plutonium separation unit were built at the Clinton, Tenn., plant. E. I. du Pont built the Clinton chain-reaction pile, which was completed Nov. 4, 1943, and operation was under the control of the University of Chicago group of physicists. Various improvements, as for instance, in air cooling, permitted this pile to operate at 1800 kw daily by May, 1944.

• The Clinton pile is rather similar to the first small pile on the Stagg Field squash court. However, the uranium is sealed in small aluminum cylinders which are pushed through channels in the graphite. The cooling air also flows through these channels. Since radioactive energy from such a large pile is extremely dangerous the whole operation is carried out within thick concrete and lead-lined chambers and handled by remote controls. The aluminum cylinders of uranium are carried under water, dissolved and carried through the separation process (plutonium from uranium) with similar elaborate precautions. All water and fumes must be carefully decaminated, by aging, to prevent the scattering of radioactive substances to the surrounding countryside.

• Meanwhile, E. I. du Pont had construction well under way on very

ENRICO FERMI

• This Italian-born physicist was intimately connected with the practical developmental work.

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large water-cooled chain-reaction piles at the Hanford Engineer Works in the State of Washington. The plentiful supply of cold Columbia River water for cooling dictated the choice. Eventually nearly 1000 sq miles of practically barren land was either bought or brought under government control in central Washington near Pasco, involving two small villages, Hanford and Richland. Work was started at Hanford in early 1943 and the first pile operated in September, 1943, and by late 1944 and early 1945 two more piles were operating.

• As of early summer, 1945, the piles were operating at designed power (undisclosed, but probably a total of well over 500,000 kw daily), the temperature of the Columbia River was being raised somewhat, and the separation plant was turning out usable quantities of plutonium.

• Naturally, plant protective devices at Hanford and purification of the tremendous volumes of cooling water to obviate serious radioactive contamination posed problems that in themselves constitute tremendous victories for the technical men involved.

• Thus, by late 1944 there were usable quantities of plutonium (from Hanford) and U-235 (from Clinton) available. Now, how about the bomb! All this work had been done to produce concentrated fissionable materials (plutonium, or U-235) with which to explore the possibility of creating atomic bombs.

• The site for the bomb work was Los Alamos, New Mexico, about 20 miles from Santa Fe. The site was secret and safe, and communication with the outside world was closely guarded, indeed.

• The first scientist arrived at Los Alamos in March, 1943, and by the end of 1944 there was an extraordinary galaxy of scientific stars there. In mid-1945 the first atomic bomb devised by man was exploded.

• At this point the work becomes most secret. It is known that either with particles of U-235 or plutonium embedded in a moderator thereby making an enriched chain-reaction pile there is a certain critical in spacing the pile—spacing of highly-fissionable particles in the graphite of over the critical distance results in not enough neutrons to producing fission to keep the chain reaction going. Spacing under the critical distance means that the pile needs only one neutron (a stray cosmic ray would do) to set the fissions going with explosive force. A second consideration was that once a bomb started to explode parts might well fly off before complete fission (or explosion) occurred (distance of travel of neutrons is small), or several explosions might result as hunks underwent independent fission. Descriptions of the actual explosions have mentioned several detonations.

• Therefore, the bomb has either U-235 or plutonium (or both) particles distributed over the critical distance in some form of moderator. Some method is used to bring these particles within critical proximity with tremendous speed (actually a small powder explosion may be the means). The case of the bomb is made of some dense material—graphite itself would do—which would reflect stray neutrons back into the bomb to increase the efficiency of fission. The moderator itself would not likely be graphite, as a liquid or gaseous medium (i.e., heavy water or hydrogen) would seem to lend itself more readily to an extremely rapid bringing of the U-235 particles to within critical distance. The chain fission would start immediately (from cosmic rays, etc.) once the particles of U-235 reached a

critical distance, and no trigger or neutron fuse would be required to initiate the reaction. Only a small percentage of the U-235 or plutonium in the bomb probably actually undergoes fission. The bomb weighs a probable 400 lb and the explosion is about that which would result from complete fission of only 2 lb of U-235 or plutonium.

• At explosion the tremendous energy released is heat, which blast gives maximum damage at a distance above the ground. The great quantities of radioactive products associated with the fission are carried up with the column of hot air and dispersed widely over the countryside. A blast in the ground, producing a crater may, however, trap some of these radioactive products in the immediate vicinity.

• Current universal popular opinion is that atomic bombs leading to a chain of future improvements have in themselves made war so devastating as to prohibit war. Such reasoning is as reassuring as that regarding the prohibitive role of the airplane so frequently mentioned a decade ago. The atomic bomb has already been used in warfare, and therefore moral strictures against its future use are nothing more than emotional rationalization. The technical minds that devised explosive atomic fission can devise counter-measures. Perhaps it will be radioactive blankets over widespread areas, radioactive anti-aircraft fire to detonate bombs or rockets carrying fission material. With the scientists mutually frustrating each other with their duels of rockets, radar, radioactivity, and atomic fission, the foot soldier will likely carry on the war in the future as in the past with the primitive's knife fastened to the end of his rifle.

• But while fission of the relatively rare and very costly U-235 or plutonium is an actuality, what secret will unlock fission of the more common elements—wood, iron, water, etc? It could be something very complex or very simple. The more advanced group of technicians that unlocks this secret would have the ultra-super-weapon, indeed. Only a small detonator might need be dropped, to initiate fission, and all the iron, or water, or wood, etc., in the wide vicinity of impact would undergo explosive fission with unimaginable destructive force, or a slower, secret radioactive fission (poison). The victim would supply the material for his own pyre as it were.

• Or, perhaps the fission of some common material could have been hinged to a tremendous concentrated release of radioactivity—such as that from an atomic bomb as now constituted. Or fission of iron, say, will accidentally occur and progress with lightning speed from some future laboratory experiment. All the races in the world would then at long last achieve brotherhood, a brotherhood of instantaneous, vaporizing incandescence. A vague premonition of such a possibility stirs through even the most self-centered humans as they watch scientists unleash forces the ramifications of which are at best only half understood.

• Happy nightmares!

Krug Urges Prompt Cancellation Of Bottleneck Items

Washington

• • • Striving for immediate expansion of civilian production, WPB Chairman J. A. Krug on Aug. 20 urged manufacturers whose military contracts have been terminated to cancel promptly their own orders for bottleneck items.

In a letter addressed to major war contractors and subcontractors Mr. Krug said that "to reduce to an absolute minimum the time required to achieve full civilian production, it is vital that orders for these materials which were placed to fill military contracts and which are no longer needed to be canceled with the utmost speed."

This action is the first departure from Mr. Krug's policy of allowing industry to proceed without government prodding, and is in line with President Truman's order to WPB continuing WPB's power to break bottlenecks and stimulate civilian production.

Mr. Krug's letter, in part, follows:

"I am writing this letter to urge every war contractor, whether prime or sub, immediately upon notification of a military cutback to cancel first any of his purchase orders for the following items which are in excess of future military or civilian production requirements and which, if fulfilled, would result in excessive inventories:

"Steel sheet and strip, structural steel, grey and malleable iron castings, lumber, shipping containers, electric motors, cotton broad woven goods.

"If your purchase orders have been placed with ratings or allotments authorized by military contracts which have been reduced or canceled but you still require the material for non-military production, your supplier should be notified immediately of the change in the priority status of your order unless the priority is one which has been automatically canceled by a direction of the War Production Board."

Third Quarter CMP Allotments Confirmed

Washington

• • • Correcting the erroneous impression that cancellation of virtually all military ratings and allotments on Aug. 17 meant the end of CMP in its entirety, the WPB announced on Aug. 18 that ratings and allotments of steel, copper and aluminum issued for production of civilian goods and components remain unchanged for the present.

This action applied only to military ratings and allotments issued by the Army, Navy, Arco and Maritime Commission, the WPB emphasized, and did not invalidate third quarter non-military allotments issued by WPB and agencies other than those specified.

The cancellation of virtually all military allotments of controlled materials and all military preference ratings assigned by the Army, Navy and Maritime Commission was designed to speed up reconversion, WPB said, by eliminating orders pertaining to cancelled military contracts and permitting the immediate placement of unrated orders. Revocation of CMP is scheduled to be effective Sept. 30 as previously announced.

RFC Undertakes Sales

Chicago

• • • Reconstruction Finance Corp. has been authorized to undertake preliminary negotiations for disposal of the Army owned armor plate plant of Carnegie-Illinois Steel Corp., Gary. The plant has operated on a greatly reduced basis for over a year and operations were temporarily suspended several weeks ago.

The Detroit office of RFC is seeking offers for the purchase or lease of government-owned property occupied by Eaton Mfg. Co. at Saginaw, Mich., including a main building of 172,000 sq ft.

The Detroit RFC office also invited offers on the blackout type factory there which had been operated by Briggs Mfg. Co. The main unit is a masonry structure 350 by 1141 ft.

Scrapping of Wage Controls Primes CIO for General Increase Fight

Washington

• • • Scrapping of the Little Steel Formula, except for a few fringes, returns wage agreements to collective bargaining and has caused speculation whether Phil Murray's USW will ask for further wage increases from the steel industry, thus setting a pattern for wage boosts generally in the period of reconversion.

The popular opinion that USW will take advantage of a clause in its contracts with steel producers and reopen negotiations for another wage boost was qualified somewhat. It was thought that USW might withhold action temporarily at least pending the labor - management conference President Truman has called for next month. Labor is seeking the same "take home" wages for a 40-hr week that it has been getting for a 48-hr week under wartime rates, including time and one-half for overtime.

In announcing on Aug. 16 relaxation of wage controls subject to the restraint of present price ceilings, President Truman asked labor and management to accept WLB decisions and to continue their no-strike, no-lockout pledge until the substitute is found at the labor-management conference for the WLB disputes machinery. The President's statement will be followed soon by an executive order.

Mr. Murray indicated to newsmen that CIO is willing to comply with the President's program but expressed the hope that the conference would not confine itself to a no-strike pledge. At the same time he said it was reasonable to assume that CIO unions would avail themselves of the wage reopening clause in the contracts made under the Little Steel Formula.

The President in his statement said that with the ending of war production, "There is no longer any threat of an inflationary bidding up of wage rates by competition in a short labor market." He proceeded to add that he was therefore authorizing WLB "To release proposed voluntary wage increases from the necessity of approval upon condition that they will not be used in whole or in part as the basis for seeking an increase in price ceilings."

Since "Little Steel" companies now have pending before OPA a petition for further price increases, it is clear that higher wages would renew demand for still further price increases, which would run counter to the Administration policy.

As pointed out by WLB Chairman George Taylor at a press conference on Aug. 18, proposed wage increases involving price rises must be approved by both the Board and the Director of Economic Stabilization.

The barring of wage cuts without WLB approval, Dr. Taylor said, does not prevent downgrading, or demotions to lower-paying jobs, but such approval is required in cases of reduction in the rate for a particular kind of work.

Relaxation of wage controls applies also to salaries, according to Economic Stabilizer Davis.

While Dr. Taylor explained that the period of the Little Steel Formula had ended, he added that he did not think that in this period WLB should lay down a long-term policy.

Meanwhile WPB Chairman J. A. Krug has urged the fullest possible measure of labor-management harmony during the period of reconversion, and appealed to American labor to continue its wartime no-strike pledge beyond V-J Day.

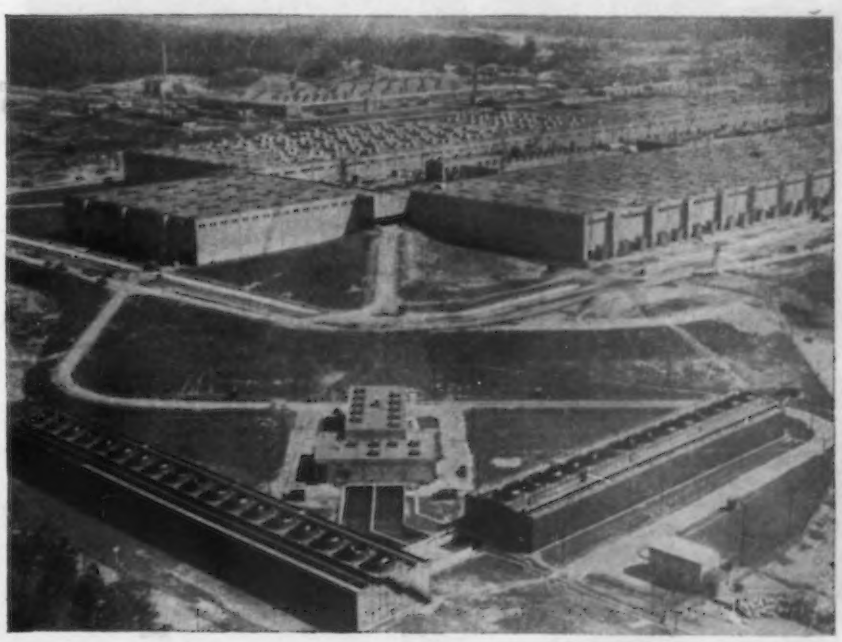
WPB's two labor vice chairmen Joseph D. Keenan and Clinton S. Golden joined in the chairman's appeal for industrial harmony during the crucial months ahead which they said will hold such great economic consequence for the nation.

"The large-scale termination of war contracts following the victory over Japan will exert a powerful influence on practically every phase of our economic life," Chairman Krug said. "Many, many workers who have served so faithfully during the war will be faced with the problem of finding a job in a peacetime industry. The sooner industry is able to reconvert, the sooner these workers will be able to get back into production."

In further simplifying the purpose of his appeal, Mr. Krug alluded to the action of WPB in maintaining certain of its controls to overcome bottlenecks that slow up reconversion. He said—

"It is with this same objective in mind—to avoid any bottlenecks which may dangerously delay a speedy return to peacetime production—that I request a temporary continuation of the no-strike pledge beyond V-J Day."

ATOMIC BOMB PLANT: *Part of the government built installations at Oak Ridge, Tenn., are shown in this air view. Facilities in Tennessee are operated by Union Carbon and Carbide Corp., and the Tennessee Eastman Co. A digest of a government technical report on the developmet of the project is found in this issue beginning on page 112.*



War Department Ready to Terminate Contracts Valued At $35,000,000,000

Washington

• • • As a result of VJ-Day cutbacks, the War Department is now faced with the task of settling $35 billion worth of canceled prime contracts, Brig. Gen. David H. Hauseman, Director of Readjustment Div., ASF, said Aug. 16. This figure, it was said, includes a backlog of 12,000 out of a total of 59,000 prime contracts valued at $29 billion which were terminated before VJ-Day.

"We are ready for the task of winding up the contracts—clearing factories of the remnants of war work and paying off the contractors," the General said.

Three factors, Gen. Hauseman said, will contribute to doing this job rapidly.

1. A simplified and direct method has been set up. The key to this is direct negotiation between the contractor and the Army Procurement Office that originally let the contract.

2. Personnel of both government and industry has been trained for this specialized work.

3. Experience has been gained in handling thousands of contracts that were terminated in the course of the war.

The guiding rules for the settlement of war contracts are set out in a single document, the joint termination regulation. This regulation is uniform for the Army and Navy, standardizes procedures in contractors plants and provides many short cuts.

Subject to protective qualifications as to amount, the regulation further provides for delegations to contractors to settle subcontractors claims without reference to higher authority. Included also are the steps whereby the contractor can dispose of his inventory, either by sale or retention. All of these provisions have been set up and tested. The rules and regulations are ready and understandable, it was pointed out, and are based on experience not theory.

A contractor wanting to clear his plant quickly of termination inventory including raw materials, work-in-process, specialized tools, or other equipment left from war work, Gen. Hauseman said, may take any of three steps.

1. He may retain, sell or scrap the inventory under policies set out by the government.

2. He may ask the government to move the inventory out, or if the government fails to do this within 60 days of the time he files a satisfactory inventory, he may move and store the inventory at the government's expense.

3. At any time within the 60-day period he may move or store the inventory at his own expense.

To make certain that the government will be able to clear war plants quickly, the RFC has set up emergency storage yards in 31 industrial areas, providing 20,000,000 sq. ft. of closed storage. In addition, there is almost unlimited open storage at Army installations for material that does not need protection from the weather.

As still further assurance that plants will be cleared rapidly, the War Department has set up 35 storage areas at strategic locations throughout the country, where scrap metals can be held temporarily. These "emergency landing fields" were set up with the recognition that much work-in-process and highly specialized production equipment used in turning out war supplies will have no civilian use and must be scrapped promptly.

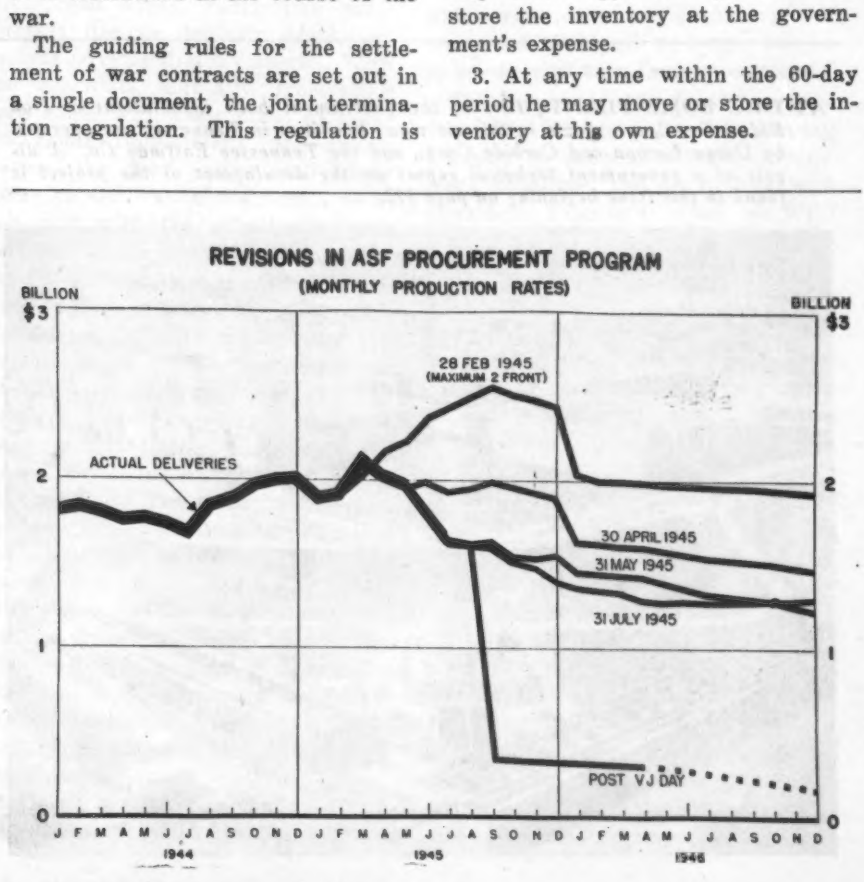
The Army has participated with the Navy and other governmental departments in putting on one of the most extensive training programs for manufacturers ever conducted. Approximately 75,000 contractors' personnel have received government training in connection with contract settlement. Government training courses will continue where necessary.

The Army simultaneously has been training its own staff to work with contractors. Today nearly 13,000 trained Army personnel are ready for this job.

With regard to the time that will be required for it to complete the job, Gen. Hauseman said that war contractors do not have to wait for final settlement in order to return to peacetime production. The goal of the War Department is, to remove every obstacle from the path of industry in order that it can effect immediate reconversion and at the same time settle all terminated contracts rapidly and fairly and clear plants immediately.

"Industry also has a large share of the responsibility," he said. "Claims must be prepared rapidly and subcontracts settled with the least amount of delay. Contractors must aid in the disposal of inventory and the clearance of plants.

"On contracts settled in July, the Army required an average of less than three months for final settlement. At the end of July, only 207 terminated contracts in the entire War Dept. had been in process of settlement for more than four months. If contractors submit their claims promptly, we can settle most contracts in four to six months, with some of the larger or more difficult ones taking six to 12 months.



Army Slashes Procurement Program; 69 Plants To Stay in Standby Condition

Washington

• • • **Speed is the objective and economy, the watchword of the Army in adjusting procurement schedules to conform with post VJ-Day needs, Lt. Gen. Brehon Somervell, Army Services Forces, said this week.**

"The coming of VJ-Day found us prepared to put into immediate high gear the many operations required for demobilization and the instantaneous reduction of expenditures. There will not be a long hangover as in the last war," he said.

The Army's transition procurement program was outlined by Howard Bruce, director of material, who disclosed that some of the major program cuts made already include artillery and tanks, 98 pct; ammunition, all types, 98 pct; construction equipment, including tractors, 100 pct; medical supplies, 50 pct; equipage and clothing, 75 pct; telephone and telegraph equipment 100 pct; tires, 100 pct, subject to resumption of buying to meet future needs; food, 20 pct.

In terms of reduction in material requirements, Mr. Bruce said that carbon and alloy steel have been reduced by 99 pct with copper and aluminum by 98 pct. The effect of depipelining will release greater quantities of steel than will be necessary for continued requirements, Mr. Bruce said. The exact tonnages involved are not known at this time but indications are that they may be considerable.

The coal situation will be relieved by Army cancellations, Mr. Bruce said, which will result in a saving of 145 million tons in the ensuing 12 months. This reduction follows a saving of over 20 million tons since VE-Day and will serve to eliminate the present national deficit of 25 million tons for the fourth quarter and make 120 million tons available for reconversion in the 12 months following VJ-Day.

With the exception of a few industrial facility projects required by long term research and development programs, all expansion contracts had been cancelled before the Japanese surrender, Mr. Bruce said.

Early recognition by the Army of the vital importance of being prepared to effect contract cancellations immediately was stressed by Mr. Bruce who pointed out that one day's delay in cutting back would involve unnecessary deliveries valued at around $40 million. In order to get ready, he said, the Army had prepared an analysis of requirements after the cessation of hostilities with Japan and ascertained those items which would have zero production requirements. This category made up 85 pct or the total Army cutbacks, he said.

Telegrams to producers of these "Zero" items had been prepared and were dispatched immediately after President Truman's announcement on Aug. 14 Mr. Bruce said, with a total of 40,000 telegrams having been sent out to prime contractors that evening. Revised schedules are being put into effect for those relatively few categories for which continued procurement will be needed.

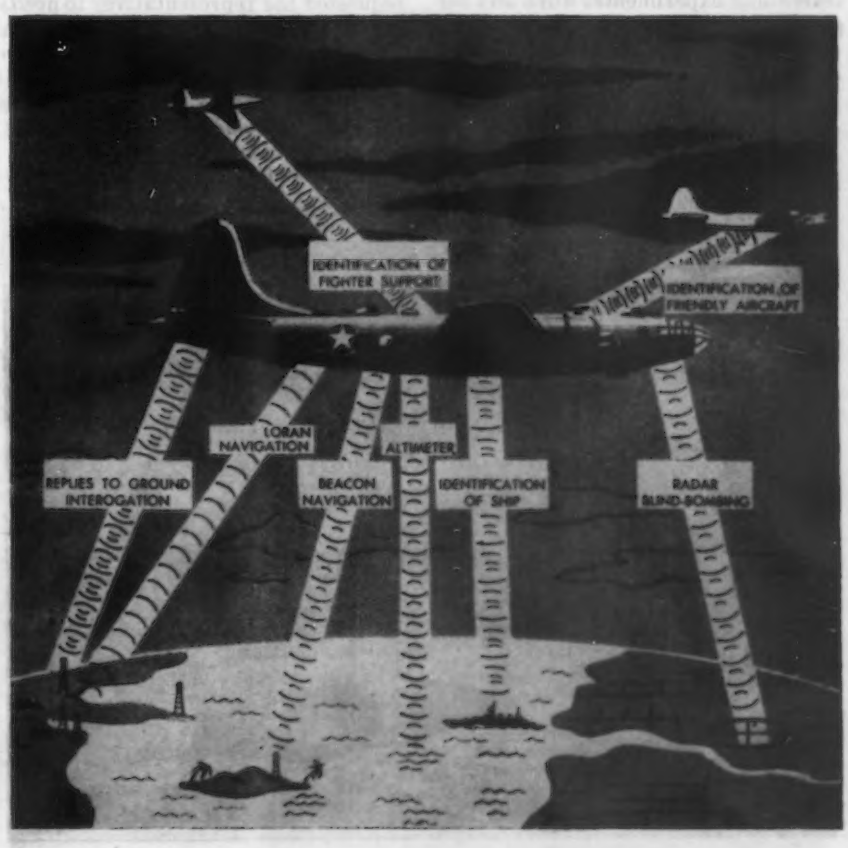
Of the 319 government-owned plants under Army jurisdiction, 69 were first selected to be retained in operation for the time being or in standby condition for future national defense, Mr. Bruce said, with the disposition of an additional 44 plants not been finally decided upon. The balance of these plants, 206 in number, have been declared surplus and will be disposed of by Reconstruction Finance Corp.

These selections are still tentative, Mr. Bruce added, it being probable that the total number of required plants will eventually be reduced. The plant lists he added will be under continued scrutiny.

The present Army procurement program calls for the expenditure of $4.4 billion in the period September 1945 to December 1946 Mr. Bruce said. The maximum two-front program called for $34.7 billion in the same period and the latest one-front estimate would have required expenditure of $20.6 billion. These cutbacks, it was said, represent reductions of 87 pct from the maximum two-front program and 78 pct from the one-front program, the immediate monthly cutback rate being around 80 pct.

The approximate $269 million of expenditures monthly over the next 16 months are largely accounted for by subsistence, Mr. Bruce said, there being a small amount for clothing and housekeeping supplies. There will also be continuing expenditures for research and development of important items.

FLYING RADAR SET: *The B-29 is completely equipped with all current radar equipment. Restrictions have been lifted recently, allowing the functions of the various systems to be explained.*



Navy Cancellations On Planes, Weapons, Ships Reach Seven Billions

Washington

• • • The Navy, like the Army, was quick on the trigger in cancelling contracts or ordering big cutbacks immediately upon President Truman's announcement at 7 P.M. Aug. 14 of the Japanese surrender. Total Navy cancellations were estimated in an official statement on Aug. 14 at nearly $6,000,000,000 of prime contracts. This is in addition to the $1,200,000,000 estimated value of the earlier cut in the shipbuilding program. Of all orders on hand for aircraft and aeronautical supplies, all but $1,134,000,000 were terminated. The Navy said that many types of procurement will be reduced percentagewise with orders for lesser amounts remaining on the books.

Since it is no longer necessary to maintain stocks of ammunition on a scale necessary to support incessant operations against the Navy, there were cuts in the procurement of ordnance materials, particularly explosives, projectiles, bombs, mines and torpedoes. Other ordnance will be cut but production will be maintained of items required for vessels under construction or repair, for research and experimental work and for the lowered requirements of the fleet resulting from the Japanese surrender.

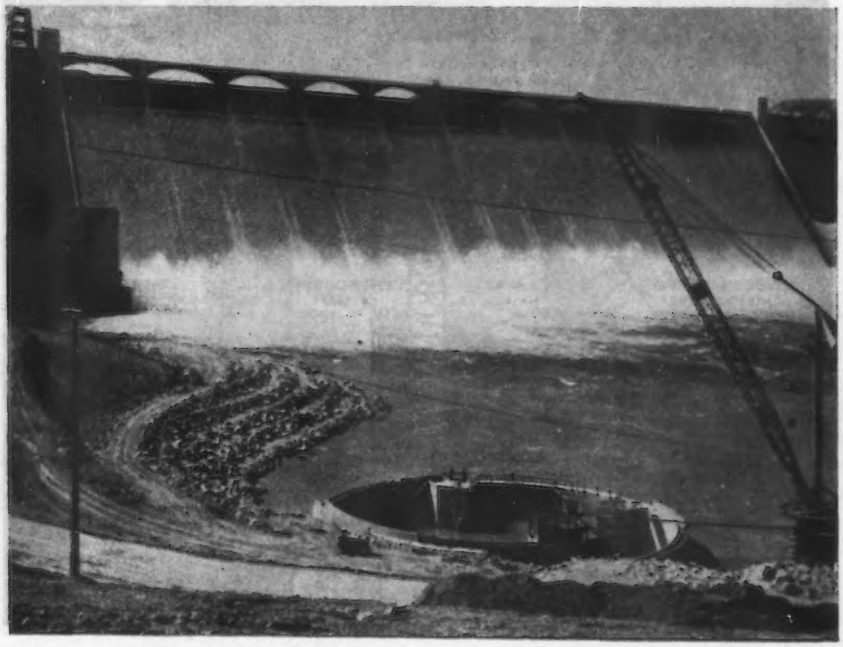
Preparations were under way several months for the termination of Navy contracts. The Navy's termination policies and procedures were established by the industrial readjustment branch of the office of procurement and materiel with a view to bringing about the speediest possible reconversion once active operations ceased.

Lists of contracts to be terminated had been prepared by the procuring bureaus and notices of termination were ready to be sent out. In order to avoid overloading the telegraph wires, and to insure prompt notification of all Navy contractors, the Navy made special arrangements with the postmaster general for expeditious handling of all of these termination notices. Sub-contractors received notices of cancellations from prime contrators.

The Navy's Bureau of Aeronautics air-mailed cancellations and reductions to each contractor. Teletype messages to bureau representatives at each plant were dispatched. These messages informed the representative briefly of the action being taken and requested the representatives to notify the contractors by telephone that termination notices were in the mail. All notices and telegrams had been dispatched two hours and 12 minutes after the President's announcement.

When the Bureau of Aeronautics began planning contract termination and revision, a theoretical V-J Day of Sept. 1 was set as a basis of planning postwar naval aircraft procurement. Two weeks ago the deadline was advanced to 5 P.M. Aug. 11. To complete preparation for the termination and cutbacks of this procurement, it was necessary to review more than 12,500 contracts—some of which contained as many as 4,200 items. It was realized that development of new weapons, such as the atomic bomb, would have substantial effect on future aeronautical research and development, so an extremely fluid program was planned.

COULEE REPAIR JOB: *A giant inland drydock is being prepared at Grand Coulee dam to repair damage to concrete work wrought by water. In building the drydock, a steel cutting edge was first set in the base of concrete walls.*



Ordnance Boss Is Now Reconversion Chief Assistant

Washington

• • • Lt. Gen. Levin H. Campbell, chief of army ordnance, was assigned to temporary duty in the Office of War Mobilization and Reconversion on Aug. 18 to aid Director John W. Snyder in the reconversion job.

In a letter to President Truman requesting the services of General Campbell, Mr. Snyder pointed out that General Campbell had laid the foundation for the huge ordnance output and had directed the biggest production job in the world in handling the $50,000,000,000 wartime ordnance procurement.

Chosen for his background in the industrial world, General Campbell brings to OWMR 25 years' experience in industrial planning and techniques. He has served in the major ordnance production centers since 1918, and in 1940 was placed in charge of the development of facilities which later became models for ordnance plants throughout the country.

Simplification Group Acts

Washington

• • • The Standing Committee in charge of Simplified Practice Recommendation R-169-37, Machine, Carriage and Lag Bolts, has approved a proposed revision of this recommendation and the Division of Simplified Practice of the Bureau of Standards has mailed copies to the manufacturers, distributors, users and others interested, for consideration and approval.

Westinghouse Postwar Plans Are Detailed by A. W. Robertson

Pittsburgh

• • • Civilian peacetime business and employment at the Westinghouse Electric Corp. in the first three postwar years following reconversion promise to approximate 1941 levels, according to A. W. Robertson, chairman. Production in that year amounted to $369,094,000 and employment averaged 71,000, both figures being the highest in the company's history up to that time. The estimated postwar business would be about double the average annual output of the company for the five prewar years of 1936 through 1940.

Mr. Robertson made public excerpts from a report to the company's employees on Westinghouse plans for changing from war to peacetime production, involving appropriations for improvements of more than $23,000,000 made since the first of the year and another $4,500,000 planned for the remainder of the year.

He explained that forecasts of future business and employment were based on studies of the growth trends in the electrical industry made by the company's planning and development committee. From these carefully made estimates, Westinghouse draws the following assumptions, Mr. Robertson said:

(1) Net sales billed for the first three years after reconversion will average $368,000,000 annually.
(2) Employment should be about as high as in 1941.
(3) Increased business in established lines and in new undertakings will be able to furnish employment to considerably more people than were employed in even the best prewar years.

Westinghouse, at the end of the war, is employing 106,000 persons, and 25,000 Westinghouse men and women are in the armed services. This would indicate that 131,000 people will be dependent on Westinghouse in the years ahead when there will be work enough for only about 71,000. However, Mr. Robertson cited several factors which will tend to reduce this apparent surplus of employees.

"Eleven thousand of our employees are married women who plan to return to home duties," he stated. "Approximately 4000 others are probably awaiting the return of their sweethearts and will be married and go to housekeeping. A total of 10,400 employees in three Westinghouse - operated Naval Ordnance plants at Louisville, Ky., Center Line, Mich., and Canton, Ohio, do not look to Westinghouse for continued employment—they have known all along that they are in jobs that have a strict wartime basis. Many of them, however, may continue working as the government takes over operation of the plants.

"While accurate statistics are not available, it is a conservative estimate that 10,000 men now working for Westinghouse will return to their normal peacetime pursuits—selling insurance, clerking in stores, doing many jobs which were not classified as essential under a wartime economy," Mr. Robertson continued. "Furthermore, judging from our experience in World War I, it is believed many veterans will wish to change their occupations and will not return to the company.

Mr. Robertson presented a breakdown of planned postwar expansions and activities as they will affect the various plants of the company throughout the country: East Pittsburgh, an expenditure of $2,000,000 is contemplated this year for rearranging factories and rehabilitating equipment and other manufacturing facilities. Plans call for another six or seven million dollars to be spent in 1946.

Appliance Division, Mansfield, Ohio, and East Springfield, Mass.—an expansion program calling for $12,300,000 was approved this year to increase appliance output by 50 pct. New buildings, tools and equipment will be added at each place.

Home Radio Division, Sunbury, Pa.—appropriations since January total $831,000 and an additional $150,000 is planned before the end of the year. This division was set up only a few months ago and is a new undertaking by Westinghouse.

Industrial Electronics Division, Baltimore, Md.—increased production of high frequency heating apparatus as well as radio transmitting and related equipment is planned.

X-Ray Division, Baltimore, Md.—doubling of plant capacity is planned.

Aviation Gas Turbine Division, South Philadelphia, Pa.—this newly organized division will carry on gas turbine and jet propulsion work in peacetime.

Steam Division, South Philadelphia, Pa.—appropriations of $738,000 are planned for new facilities in addition to $140,000 already provided for major rearrangement of division's foundry at Attica, N. Y.

Air Conditioning Division, Jersey City and Boston—the recent acquisition of Sturtevant Co., Boston, together with previously owned facilities at Jersey City gives the company

LABOR SCHOOL: *Organizers of the Amalgamated Meat Cutters Union have been attending a summer session at the University of Wisconsin. The courses are suggested or requested by the union, and are given by economists from all over the country.*

Industrial Briefs . . .

• BUYS STEEL FIRM—The Frederick Iron & Steel Co., Frederick, Md., was purchased recently by a syndicate of Cincinnati businessmen. The reported assets of the company was stated to be in excess of $800,000, consisting partly in foundry and machine shop for the manufacture of centrifugal pumps, stokers, and other products. Sydney G. Rose, head of the Cleveland Wrecking Co., Cincinnati, will become president of the firm.

• IMPROVING WIRE MILL—The Wickwire Spencer Steel Co. has announced plans to spend $1,500,000 on improvements at its River Rd. wire mill in Buffalo which will increase productive capacity by 50 pct. Robert T. Dunlap, vice-president in charge of operations, said the program will be carried out as rapidly as materials are available.

• AWARDED CONTRACT — Construction contract for the new semi-works plant of the B. F. Goodrich Chemical Co., at Avon Lake, near Cleveland, Ohio, has been awarded to John Gill & Son, Cleveland. Cost is to be around $600,000.

• DISSOLVES SUBSIDIARY — The functions of the Armco Railroad Sales Co., a wholly-owned subsidiary of American Rolling Mill Co., were discontinued recently, the company announced. The sheet and wheel business of Armco Railroad Sales Co. has been taken over by American Rolling Mill. Drainage and fabricated products in the railroad field will be handled by Armco Drainage & Metal Products, Inc., another wholly-owned subsidiary. All the company's key men and clerical force will become part of the Armco organization.

• NEW DIVISION—Certified Alloy Valve Co. has been formed as a new division of Cooper Alloy Foundry Co., Hillside, N. J. The new company will specialize in the manufacture of stainless steel valves. P. C. Shaffer has been made chief engineer. Products will be sold through Cooper.

• CHAIN BELT EXPANDS — The Chain Belt Co., Milwaukee, plans to build a $250,000 one-storied addition to its plant to provide more space for steel storage and structural steel fabrication.

• A. O. SMITH BUILDS—The A. O. Smith Corp., Milwaukee, will spend close to $2 million on its Milwaukee and St. Paul plants in equipment and machinery to allow for increased production on a newly designed hollow steel propeller blade. Some 1000 additional workers will be needed.

• HALTS OUTPUT — With the completion of nearly 500,000,000 units, production on machine gun belt links has been halted by the American Can Co.'s Hudson plant in Jersey City pursuant to orders from the Army Ordnance Department. Employees engaged in this operation are being absorbed in other essential work at the plant.

the most complete organization in the air-conditioning and air-handling industry.

Lamp Division, Bloomfield, N. J.—the sum of $4,590,000 has been made available for new facilities for making incandescent lamps, fluorescent lamps, tungsten and molybdenum wire, lamp bases, etc., additional appropriations of $635,000 are planned. The lamp business of Ken-Rad Tube and Lamp Corp. at Owensboro, Ky., was also recently purchased and a new glass plant is in production at Fairmont, W. V.

Elevator Division, Jersey City—there has been $931,000 provided for expansion and improvement since first of year. Appropriation of an additional $668,000 is contemplated before the end of the year.

Transformer Division, Sharon, Pa.—business is expected to run 25 pct ahead of 1937, the best prewar year. Plans are being made for the construction of a record-size transformer for an experimental transmission line that would carry voltages higher than any existing line in the country.

Small Motor Division, Lima, Ohio—More than $2,000,000 has been appropriated to equip this plant for the manufacturer of high torque and ironer motors, hermetic motors and controls and to purchase government-owned tools and rearrange existing facilities for civilian work.

Meter Division, Newark, N. J.—appropriations of $442,000 have been made for purchase of new equipment and changing of factory layouts.

Bryant Electric Co., Bridgeport, Conn.—appropriation of $685,000 made for land and new buildings has been made.

District manufacturing and repair divisions—reconversion plans involving expenditure of nearly $600,000 this year have been completed.

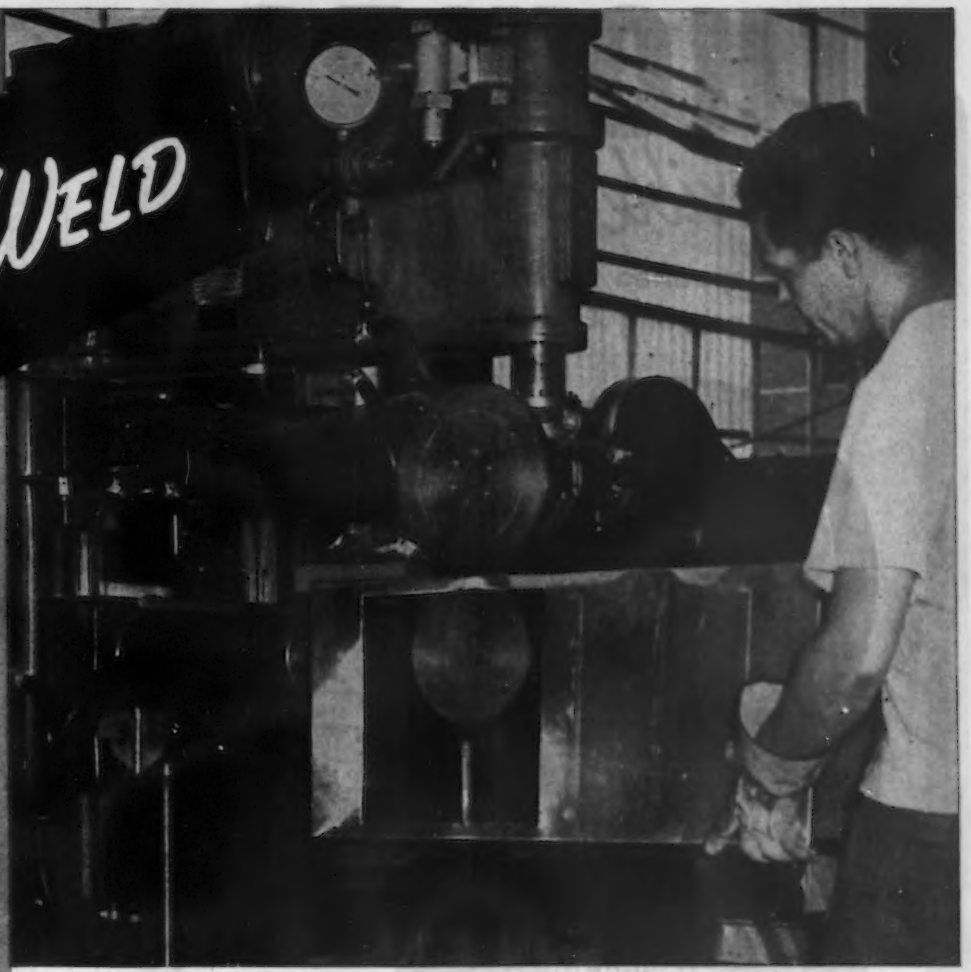
Along with extensive plans of the parent company, the Westinghouse Electric Supply Co. also is widening its scope. It is the national wholesale marketing outlet for the company. Established sales companies at Dayton and Columbus, Ohio, have been purchased and a new headquarters set up in Oakland, Calif., with four times the former floor space.

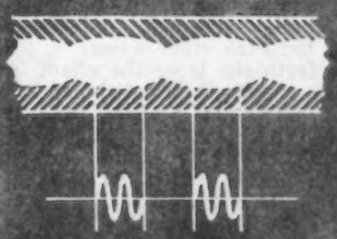
In the immediate postwar period, emphasis will be placed on the production of electric appliances to fill the pent up need that has resulted from complete stoppage of appliance output during the war period. Westinghouse looks for dollar sales in this field to be 138 pct above those of 1941.

Included in 23 kinds of appliances will be several that have not been available before. These include home freezers, precipitron, the laundromat (a fully automatic cycle washing machine), the automatic clothes dryer, and other items.

SEAM WELD

...when it has to be watertight





Schematic cross section diagram of a seam weld. Interrupted current is generally used and produces a succession of overlapping spot welds. Electronic timers control the sequence of a typical setting: 2 cycles weld time and 2 cycles off time. Current values slightly higher than used for single spots are required due to the shunting of the adjacent weld.

FAST Higgins landing craft must use distilled water in the cooling of their power plants. It is essential that the distillation unit be both sturdy and splash-proof.

In fabricating this unit, Higgins Industries, Inc. uses *seam welding*. The Sciaky welder above is speeding the production of distiller cabinets. A single sheet of 24 gauge Monel metal is formed, then welded with a single longitudinal lap joint near the corner. The result is a strong, waterproof joint, produced with speeds up to 78" per minute. No special skill is required of the operator.

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Global Salesmanship

The American salesman, according to the humorous British weekly, *Punch*, starts out by saying: "Look, Bud, I'm not selling *you* anything." Then he slaps the client violently on the back, delivers a highly colored address on the virtues of his wares and produces an order form already filled in and signed.

* * *

"The German salesman bows in old-world courtesy and gives the current salute. Then he makes a short speech loaded with statistics, on the might of the Fatherland. He exhibits his sabre wounds, recounts the details of his many victorious duels and presents his order form."

* * *

As for the Japanese salesman, "Before opening the negotiations, he places a curved sword on the table and intimates that he will commit hari-kari if he isn't given the order. He apologizes in advance for any mess he may make on the carpet."

* * *

But "The English salesman apologizes immediately for being two weeks late. He is silent for a spell. Then he suggests a drink. After a heavy and silent meal and a number of drinks, the English salesman and his client bid each other adieu.

"A fortnight later the client sends a wire to the Englishman: 'ANYTHING TO SELL? YOU DIDN'T SAY.'

"And the Englishman answers: 'SAME OLD STUFF. WHY? LIKE SOME?'

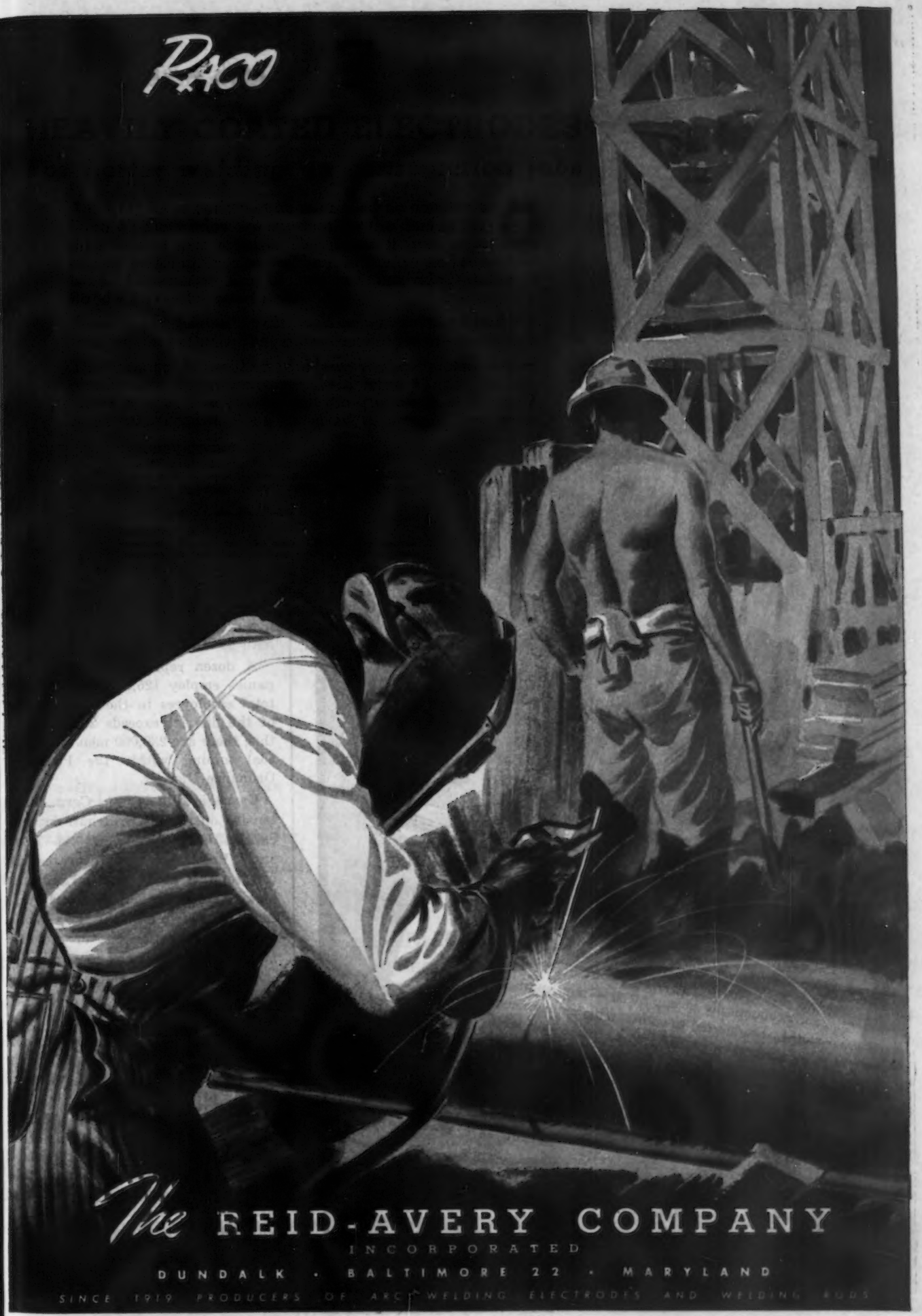
"The client wires back: 'WHY NOT?'

"And the Englishman replies: 'RIGHTO. BE ROUND AGAIN END OF CRICKET SEASON.'"

Powder Plants Close

Wilmington

• • • **In accordance with** instructions from the War Department, Hercules Powder Co. has begun closing down four of the government-owned plants which the company operates, it was announced recently by W. R. Ellis, general manager of the Explosives Dept. The four plants which are being closed down are: New River Ordnance Plant, Pulaski, Va.; Radford Ordnance Works, Radford, Va.; Volunteer Ordnance Works, Chattanooga, Tenn.; and Missouri Ordnance Works, Louisiana, Mo.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SINCE 1919 PRODUCERS OF ARC WELDING ELECTRODES AND WELDING RODS

Mills in Pittsburgh Ordnance District Double Jap Production

Pittsburgh

• • • Enough steel to girdle the world with a 1-in. round bar long enough to circle the earth 539 times at the equator, or nearly 95,000,000 ingot tons, has been produced by steel mills in the Pittsburgh Ordnance District in the 45 months since Pearl Harbor.

This astonishing production record was revealed this week by Col. Robert C. Downie, chief of the Pittsburgh Ordnance District, in a review of the district's activity during almost four years of war.

Other highlights from Col. Downie's report, comprising some of the outstanding contributions in the annals of steel, follow:

Pittsburgh's plants collectively are producing more than twice as much steel as the Japanese empire. One of those plants alone is producing half as much as Japan. Each of a half-dozen others is producing nearly a fifth as much.

A dozen representative steel companies employ 125,000 workers. The total employees in the steel industry of the district exceeds 250,000. With this, there are 230,000 men engaged in coal mining within the Pittsburgh Ordnance District.

Carnegie-Illinois Steel Corp. has extensive operations in a half-dozen localities in the district. At Homestead, Pa., the company operates what are reputed to be the largest steel making facilities in the world. Its continuous strip mill, the Irvin Works, is without question one of the engineering marvels of the country.

The Jones & Laughlin Steel Corp. operates two mills in the district, at Pittsburgh and Aliquippa. Collectively these plants are equipped to produce a wide range of hot rolled and cold finished products, rod, wire and tubular products.

At Weirton, W. Va., the Weirton Steel Co. produces basic steel, structural steel, tinplate, and related products. At Johnstown, the Bethlehem Steel Co. operates an integrated plant with blast furnaces, rolling mills, steel department and rod and wire departments. The Wheeling Steel Corp., with units stretching from Steubenville, Ohio, through Wheeling, W. Va., as far as Portsmouth, Ohio, is

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IN ANY TYPE of business where accuracy, speed, and uniform production are necessary, the streamlined, sturdily-built, cost-saving, and safe TRANSPORTER with its trouble-free operation is a real assistance—through its ability to move materials smoothly, speedily and dependably.

The TRANSPORTER in an exceptionally wide variety of applications, demonstrates its flexibility, its ability to work in small areas, its ease of handling, and its advantages in moving greater tonnages in shortest time with safety. Unnecessary handling is eliminated.

The TRANSPORTER saves man hours, and costs in moving materials from receiving to storage, through production and to shipping.

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equipped to produce, in addition to basic steel, a wide variety of related specialty products.

Because Pittsburgh district facilities had the equipment and the technical background to make shell steel and to roll shell billets, Pittsburgh's ammunition record has constituted a greater contribution to the district's war effort than any other single item. In the period between Pearl Harbor and Aug. 1, 1945, district facilities have produced a total of 52,570,802 artillery shot and shell, ranging from 20 mm to 240 mm in caliber, all finish machined ammunition. Of that total nearly 28,000,000 pieces were 3 in. or larger in diameter. Particularly in the heavy ammunition field did Pittsburgh excel. At the height of the program district plants were turning out a schedule of 176,000 8-in. howitzer and rifle shells per month. The size of that job alone may be clearly visualized by remembering that such shell range in weight from 176 lb to 200 lb each.

Pittsburgh's finished shell production does not constitute its entire ammunition activity, however. Many of the larger facilities in the district produced their own shell forgings. Some, however, were small plants having only facilities for the machining of shells, hence their forgings had to be procured from plants specializing in that field. The larger Pittsburgh plants had excellent forging facilities and consequently acted as suppliers for these machiners in this and other Ordnance districts. Special mention should be made of one district facility, the National Supply Co., at Ambridge, Pa., which, to date in this war, has itself produced over 25,000,000 shell forgings ranging in size from 75 mm to 5 in. No accurate figures are available on the number of forgings produced by all companies in the district, since that work is now all handled on a subcontracting basis. However, the total forgings produced for machiners in this and in other districts may conservatively be placed at about 50,000,000 pieces.

For the same reason as on shell, Pittsburgh was a heavy producer of bombs. Virtually all of the district's general purpose bomb production has been by the spinner method in which the ends of the seamless steel tubing are heated and the bomb nose and tail shaped on a spinning machine. Since Pearl Harbor the Pittsburgh Ordnance District has produced a total of

11,253,408 bombs of all types, ranging in capacity from 4 lb to 4000 lb. The total weight of those bombs is 782,777 tons, a quantity sufficient to load 600 B29's for a trip over Tokyo every day for nearly seven months.

The success of the bomb spinning program is in no small measure due to the pioneering and research of two Pittsburgh facilities, the National Tube Co. and the National Valve & Mfg. Co., which perfected the present method of spinning the bomb nose and tail. And since the figures above include fragmentation bombs also, the National Tube Co. and the American Locomotive Co. at Latrobe, Pa., deserve special mention for their pioneering in the development of the coiled fragmentation bomb body which is currently being used with outstanding effect against the Japanese.

One other item in heavy production in the Pittsburgh Ordnance District is tank armor plate. Pittsburgh was a natural for that type of production because of its excellent flat rolling facilities in the district and because of the ingenuity of management in converting to plate rolling.

One Pittsburgh facility, the Jones & Laughlin Steel Corp., developed a low alloy analysis for tank armor plate and converted its strip-sheet mill at Pittsburgh to that production. To date a total of 160,646 tons of armor plate for tanks have been rolled in that mill.

Shells and bombs and armor plate constitute only three of the many bar, rod, wire, sheet and tubular products which have gone into the war effort from Pittsburgh. In addition to the conventional types of hot rolled steel which have found their way into war uses, hot rolled bars and plates have been used for bullet jacket core sections, tank treads, truck wheel rim sections, small caliber shell stock, bombs, fuzes, adaptors, base plugs, etc. Cold finished products have been used for automotive parts, bazooka parts, bomb parts, various cartridge caps, cartridge containers, fuze bodies, grenade launcher parts, 20, 37, and 40 mm shell, .30 and .50 caliber bullet core, etc.

Tubular products have included bomb body stock, invasion pipe line, oil country line, shell containers, gas cylinders, constructural tubing for aircraft and tanks. Strip mill products included tank armor plate, ship plate, portable landing field sections and the usual line of strip-sheet prod-

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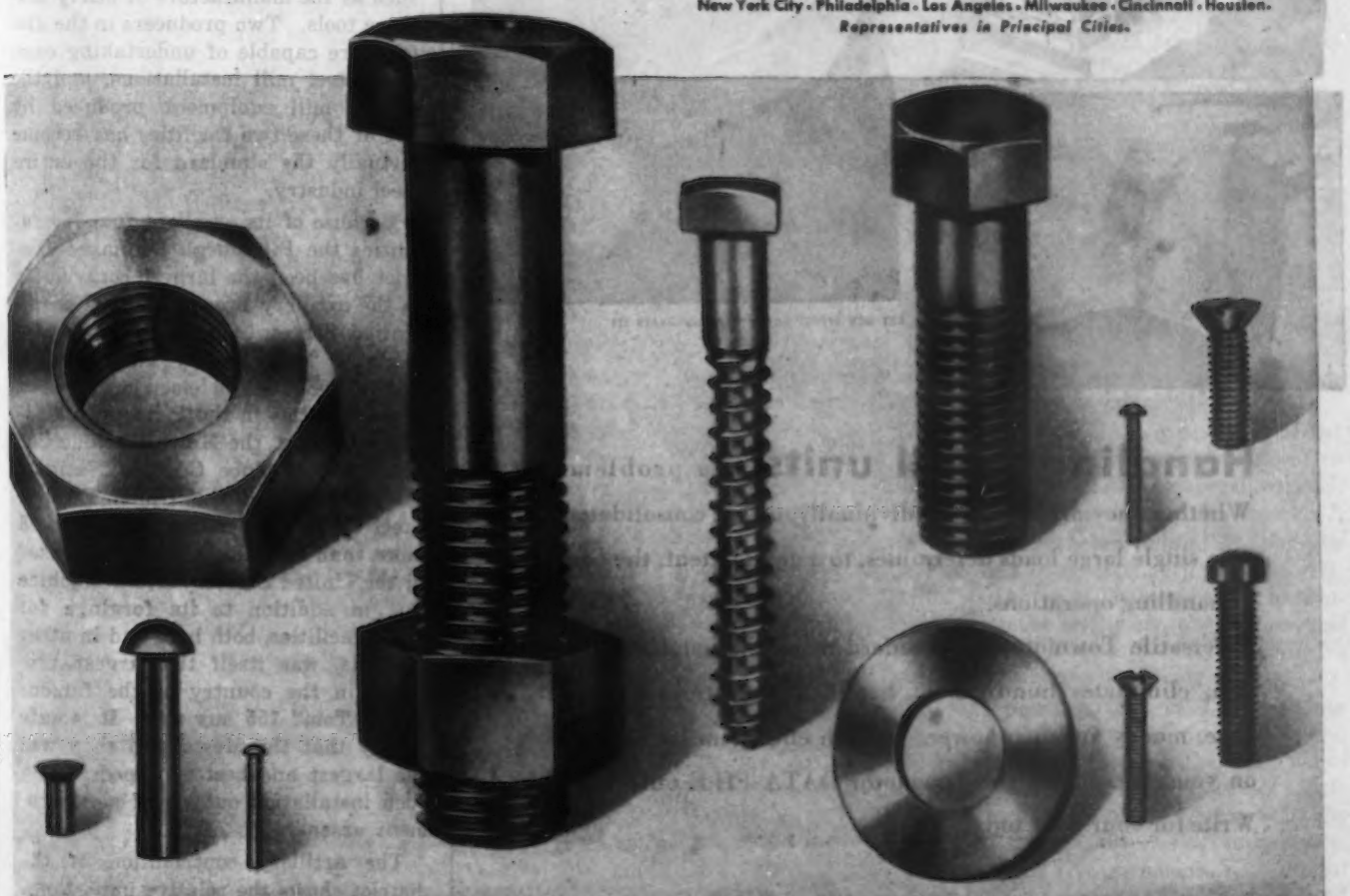

HARPER

EVERLASTING FASTENINGS

ARMY E NAVY

BRASS • BRONZES • COPPER • MONEL • STAINLESS

ucts which have been fabricated into thousands of war items.

There is little that the steel industry of the Pittsburgh Ordnance District has not accomplished in its war effort. Its products have ranged from huge structural sections for the Army Engineers, through the whole gamut of shell billet steel, down through to steel wire 0.005 in. in diameter, scarcely larger than a human hair.

Despite the interest on basic steel production, there is in the district a preponderance of facilities devoted to the casting of steel. Steel which is designed for intricate shape or special purpose is usually cast or forged, in many cases both cast and forged, and the foundries of this district are so diversified in their operations that castings ranging in size from several pounds each to as much as 600,000 lb are not unheard of. Some specialize in castings for other producers, still others produce castings in conjunction with their own regular production, such as the manufacture of heavy machine tools. Two producers in the district are capable of undertaking complete steel mill installations, and the rolling mill equipment produced by one of these two facilities has become virtually the standard for the entire steel industry.

Because of its excellent foundry facilities the Pittsburgh Ordnance District has been the largest contributor to the artillery program in the entire United States. Gun steel is of particularly high quality and strength and is produced in electric furnaces. Four facilities in the Pittsburgh Ordnance District, the Mesta Machine Co., the National Tube Co., the National Supply Co., and the Union Electric Steel Corp., have collectively produced more than half the gun forgings used in the United States. Mesta Machine Co., in addition to its forgings for other facilities, both here and in other districts, was itself the largest producer in the country of the famous "Long Tom" 155 mm rifle. It is safe to say that the Mesta gun shop was the largest and best equipped of any such installation outside of a government arsenal.

The artillery contribution of the district shows the relative importance of the Pittsburgh Ordnance District. During the war the four facilities mentioned above produced a total of 17,233 forged and rough bored and turned gun tubes. In addition to its participation in gun forging produc-

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tion the Mesta Machine Co., produced 2443 finished 155 mm guns, more than half the entire country's production of that item.

At New Castle, Pa., the United Engineering & Foundry Co., early this year began production of the finished 240 mm howitzer and has since maintained an excellent production record. Incidentally, this is the first plant in which that gun has been produced outside a government arsenal.

Additional artillery items: The Aetna-Standard Engineering Co., Ellwood City, was the district's principal producer of gun mounts and turned out a total of 1,341; and at present the Miller Printing Machinery Co., Pittsburgh, is producing what is probably the most critical artillery item in the book today, the 75 mm recoilless rifle. To date many such rifles have been produced, Miller being the only company assigned to the item; a remarkable new development. This gun, 105 lb in weight, may be carried over the roughest terrain which may be encountered in the Japanese islands and is fired from a machine gun mount. Its range is 4½ miles and its projectile, weighing 14 lb, has the same destructive power as the projectile from the old 75 mm field piece.

There is more to the story of Pittsburgh's steel contribution than the mere all-out production of basic steel products. The industry was ready for war when it came. New blast furnaces had been built and old furnaces rehabilitated. Byproducts plants had been greatly expanded. New stripping facilities had been constructed for stripping hot top ingots from which shell billets are rolled. Due to critical shortages of cold scrap bessemer production was stepped up, the bessemer molten steel being substituted for scrap in the openhearth furnaces.

Typifying the cooperation of district contractors. In the spring of 1943 a critical shortage of brass rolling facilities had developed in this country. Frank B. Bell, then chief of the Pittsburgh Ordnance District, suggested excess steel rolling mill facilities as a solution to the problem. The suggestion was hitherto unheard of. Leaders in the brass industry felt that grain size could not be controlled on such a mill. But the Weirton Steel Co., with excess rolling mill capacity, undertook the job and not only licked it, but for a period of many months continued highly successful

operations in brass rolling until the situation became less critical. Weirton had known nothing about brass rolling, but its production was successfully processed into cartridge cases at Frankford Arsenal.

The principle of bonding copper or gilding metal to steel has long been known in this district. The Copperweld Steel Co. has for many years produced rod and wire clad with an exterior of copper. The Superior Steel Corp., also of this district, had in peacetime been producing clad metal known as "Su-Veneer" metal, which consisted of steel sheets clad with varying thicknesses of copper. Follansbee Steel Corp. also had developed a process of copper clad sheet manufacture. Such a metal seemed to be ideal for the manufacture of bullet jackets, since the composite product could readily be blanked and drawn while at the same time saving approximately 80 pct of the bulk in copper.

Superior Steel Co. has, since 1941, been producing clad metal in great quantities and Weirton Steel Co. produced at a high rate until the small arms ammunition program was cut back in 1943. Both held prime contracts for blanked jacket cups and these two facilities, with their subcontractors, together blanked out a total of 5,000,000,000 small arms ammunition jackets, a quantity greater than that produced in the entire United States during World War I.

Practically every type of projectile, both armor piercing and high explosive, from 20 mm to 240 mm in caliber is produced here. Fragmentation bombs in sizes from 4 lb to 820 lb are among the Pittsburgh products and the district has produced millions of general purpose and armor piercing bombs ranging in size from 100 lb to 4000 lb.

Production in small arms ammunition cups in this district has exceeded 5,000,000,000, an amount greater than the production of the entire United States in World War I. Other products have included a wide variety of fuzes, some actually loaded with the explosive in Pittsburgh plants. Gun tubes ranging in caliber from 37 mm to 240 mm have come from the forge and machine shops of the District. One Pittsburgh producer whose peacetime product was railroad track bolts and accessories established the country's best record in the production of rifle and pistol barrels. Former hosiery mills produced parachutes for flares and fragmentation bombs. A

NEWS OF INDUSTRY

Pittsburgh awning company was an outstanding producer of the most complicated tank and gun covering.

Probably the most valuable contribution of the District has been its procurement of heavy caliber ammunition. When war dictated the need for such items, Pittsburgh Ordnance District responded as usual. The production of nearly 176,000 8 in. rifle and howitzer shell per month in the district itself indicates Pittsburgh's preeminence in this field. That quantity of 8 in. shell incidentally was greater than that produced by any other Ordnance District. Pittsburgh, since Pearl Harbor, produced material for the War Department, Navy Department and other governmental agencies engaged in arming this nation for war, valued at more than $19,000,000,000.

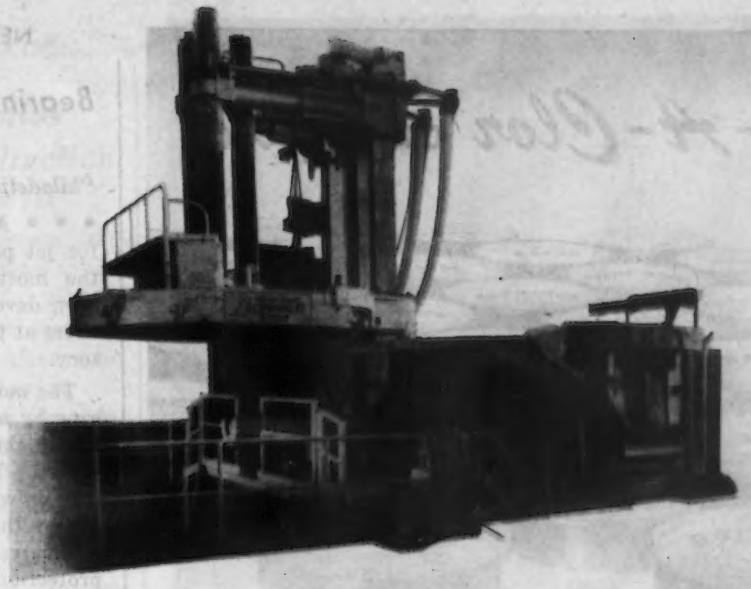
THE RECORD

20 mm to 60 mm shell	12,867,255
30 mm to 240 mm shell	27,653,864
20 mm to 57 mm shot	11,792,092
75 mm to 90 mm shot	257,591
Total of shell and shot	52,570,802
Bombs all sizes, 4 lb to 4000 lbs	11,253,408
Total weight, tons	782,777
50 cal. belt links	823,060,300
Clay Targets	73,775,350
Brass time train rings	12,506,000
Cartridge cases	3,634,373
Fin assemblies for bombs	8,268,899
Bomb fuses	6,115,386
Hand grenade fuses	55,413,221
Ammunition boosters	47,779,079
Gun tubes, rough turned	17,233
Finished 155 mm guns (Long Tons)	2,443
Gun mounts	1,341
240 mm Howitzer tubes	47
16 in. coastal defense gun mounts	7

The Pittsburgh Ordnance District consists of the western half of Pennsylvania and all of West Virginia, plus counties of Belmont and Jefferson in Ohio, Allegany and Garrett in Maryland and drop off Erie, Mercer and Crawford in northwestern Pennsylvania, embracing more than 50,000 square miles.

Because of the nature of its industries, Pittsburgh is essentially a subcontract district. In prime contracts the district has administered contracts exceeding $1,333,000,000. Of that total about $333,000,000 has been terminated.

Within the boundaries of the Pittsburgh Ordnance District are steel plants with ingot capacity totaling nearly 23,000,000 tons annually and approximating some 25 pct of the nation's steel output.



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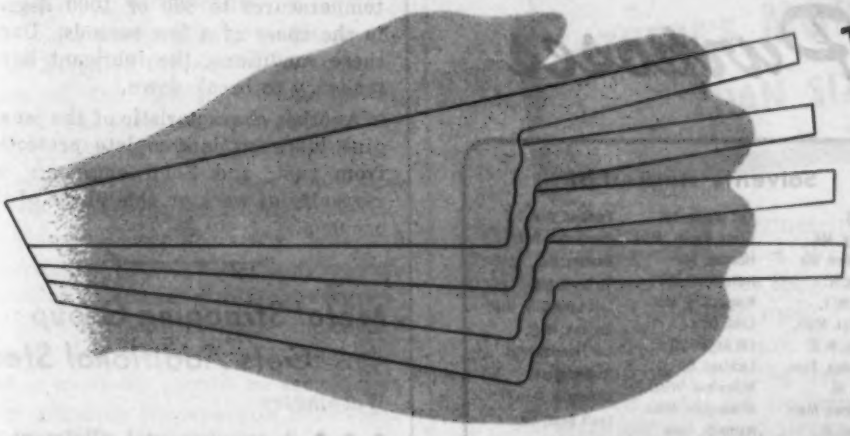

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LONG LIFE

● **These are FACTS, being demonstrated day after day in normal plant practice.**

The Lectromelt top-charge furnace is the most efficient furnace for melting quality steels and irons. Every detail of design and construction is engineered with the experience of more than twenty-six years specialization in electric furnace work—they are rugged, enduring, simple in mechanism. Movement of one valve mechanism lifts and rotates the roof, ready for loading with the drop-bottom charge bucket, which is positioned and discharged with equal simplicity.

These are the fundamentals of furnace efficiency and operating success. We solicit your inquiry.

PITTSBURGH LECTROMELT FURNACE CORP.

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Bearing Oil Spray Reduces Jet Heat

Philadelphia

• • • A new method of lubrication for jet propulsion engines, said to be the most effective yet devised, has been developed by Shell Oil Co. engineers at their Wood River, Ill., laboratory.

The new method lubricates a jet engine by means of spray, consisting of 95 pct chilled compressed air, and five pct oil. The spray hits the ball bearings on which the single axle revolves, and as the air cools the metal, the oil lubricates and furnishes some rust protection. The spray is exhausted into the jet.

Although one of the advantages of a jet propulsion engine is a reduction in the lubrication required, the intense heat generated creates a new set of oiling problems. And among the major difficulties in a jet engine lubricant is that the oil jumps from low temperatures to 800 or 1000 degrees in the space of a few seconds. Under these conditions, the lubricant has a tendency to break down.

Another characteristic of the jet engine lubricant is complete protection from rust, and Shell engineers are currently at work on this phase of the problem.

Metal Strapping Group Gets Additional Steel

Washington

• • • A supplemental allotment of 10,900 tons of carbon steel has been granted by WPB to the metal strapping manufacturing industry to meet special military packaging requirements. Third-quarter allotments of carbon steel to the industry now total 129,500 tons.

Military packaging specifications have required constantly increasing allotments. It should be realized, however, WPB added, that the plants —there are 25 of them in the entire country, of which six are the large producers — receiving these carbon steel allotments cannot put the total amounts into metal strapping, since they must also make or acquire tools, accessories and fittings needed in connection with the use of metal strapping.

The advantages of the use of steel strapping, according to the Containers Division, include savings of manpower, lumber and paperboard.

FEATURE CONTINUATION

Permeable Refractories In Furnace Construction

(CONTINUED FROM PAGE 71)

the loads handled by the furnace, and fig. 2 shows a graph of thermal input per unit weight of load, plotted against intensity of hearth loading. The authors stated that, after consideration, they felt it wiser to express their results in this way in order to show clearly the variation in efficiency which occurs at different intensities. It will be appreciated that such variations as are shown for loads of the same intensity are probably caused by variations in superficial area of individual items of the load, their distribution, sectional thickness, and atmospheric temperature. The furnace has been working for five months, and in this time has handled over 900 tons of castings.

Refractories

In the previous data[1] a description was given of the nature and properties of the special refractories on which the successful operation of the permeable lining furnace depends. In comparison with ordinary dense firebrick, these open-textured materials are weak, and laboratory tests will show that they are markedly susceptible to deformation under pressure at high temperatures. The indications were that the permeable materials then available should be satisfactory at operating temperatures not exceeding 2150°F. In arriving at this conclusion account was taken of the temperature gradient which exists in the lining in practice, the effect of which is that only a relatively thin layer of the brick nearest to the hot face is subjected to such temperatures. Experience with industrial installations, so far, has shown this conclusion to be well founded. One particular furnace with a permeable lining of fireclay material has been in operation for almost one year at an average furnace temperature of 2100°F. Although some slight shrinkage of the permeable material is noticeable, it has been insufficient to cause any trouble, and the general condition of the lining is good.

In view of the shortcomings which might be expected of the lightweight permeable refractories, the authors have paid particular attention to the condition of the linings of the several

industrial furnaces now in operation. It may be stated that, up to the present, the difficulties anticipated both by them and in the discussions of the previous Paper have not materialized. Thus, clogging of the permeable refractories by dust in the air or the furnace atmosphere has not been experienced; in a small annealing furnace, for example, the need to use the equipment provided for blowing air through the lining to clear the refractories has never arisen. The indications here are that the permeability of the lining has increased during service rather than decreased, due most probably to some opening up of the joints. Some shrinkage has been noticed in other furnaces, but it is negligible in amount and effect; there has been no evidence of thermal spalling. These conclusions are based mainly on a visual inspection of the furnaces.

Regarding the large bogie furnace referred to in the foregoing, this is one of the largest permeable installations. On the whole, the condition of the lining is promising; there is no evidence of appreciable distortion although a certain amount of cracking is visible. In view of the fact that the main thrust of the arch is carried largely by permeable side-walls, the experience with this furnace, so far, appears to augur well for the reliability of permeable materials for application on this scale.

Carnegie-Illinois Inaugurates 40 hr. Work Week in Mills

Pittsburgh

• • • Carnegie-Illinois Steel Corp. announced Monday that the 48-hour work week would be dropped and a 40-hour, five-day work week reinaugurated. The effect will be that each plant and office force wage earner and non-exempt salaried employee will go on a 40-hour week be-beginning immediately. Other U. S. Steel subsidiaries are expected to follow this plan.

Other steel producers anticipate that they will move into the 40-hr. work week quite rapidly, but not on a general basis. The work week will be reduced department by department as the need arises, and best estimates are that the process will begin very soon.

CIO Touches Off New Wage Drive Following Lifting of Controls

Pittsburgh

• • • CIO President Philip Murray opened the drive for higher wages on Friday, Aug. 17, with the announcement that all CIO unions will ask employers for collective bargaining conferences to negotiate higher wages in the light of the President's newly liberalized wage policy. When asked if Murray's statement implied that all steel company contracts would be reopened, a spokesman for the CIO-USWA stated that he did not know.

Again within the period of a year, CIO leads the steel industry into another wage battle. The outcome, while not yet known, is not too difficult to estimate. CIO will probably get the bulk of what they ask for, despite the fact that price ceilings will remain in effect. Mr. Truman's statement that wages cannot be increased if such increases result in an increase in prices, apparently leaves the steel industry with some hope that economic stabilization has not yet been abandoned. However, this is a pretty slim thread to cling to in fighting against a general wage increase.

Another phase of the wage angle that is pretty interesting at the present time is the question of war-time clauses that were injected into the contracts early this year at the order of the War Labor Board. Clauses such as those on maintenance of membership, checkoff, and newly defined shift differentials, still are considered by many employers as temporary emergency benefits, but there is no question in the minds of anyone that the CIO-USWA will fight to the last ditch to maintain them.

At a time that the country should have complete accord between labor and management, it appears that one of the bitterest fights for wage increases is about to start, and, before it is finished, strikes, production tie-ups, lock-outs, and turmoil will likely again come into the headlines.

While none of the steel companies, as far as can be determined, have been approached by the CIO in its new drive for higher wages, all expect to be shortly called in for negotiations and notified that contracts will be re-opened. Most CIO contracts contain the clause that they can be re-opened by either party, and it will probably be only a matter of a week or so before such a request by the CIO will be made.

MACHINE TOOLS

. . . News and Market Activities

Tool Cancellations Prove Slow; Builders Quietly Confident

Cleveland

• • • Aside from consequent confusion, V-J Day occasioned little apparent change in the machine tool industry—builders are still busily chewing away at the backlogs. Cancellations are developing slowly, but as yet, few builders have received much tangible information. Some questions have come up on termination policy, but again, very little has occurred in the way of terminations.

Cancellations are an understandable source of considerable concern, the industry is anxious to know where it stands. One reason for this slowness may be that machine tool builders are usually sub or sub-sub contractors. Another reason is indecision on the part of the contractors who may be wondering whether they want to keep the machines themselves, or whether they really should cancel. This situation is further complicated by the financial position of contractors, who may feel that the immediate postwar market for their product is questionable and are debating whether or not they should link up these machines with new and untried products.

The order situation is quiet, and no peak buying is expected although builders do anticipate a clearing of the road for foreign orders within the next two or three months. In a broad sense, the reconversion demand is contingent upon a number of crisscross factors, any one of which may tip the balance in the other direction. Clumsiness of the RFC in handling surplus machines may easily turn the buyers to the new machines. Along with this is the slowly growing demand from foreign nations, whose purchasing power is largely dependent upon their ability to get credit from the export-import bank, and also upon Washington's ability and willingness to shorten the process of buying so that the people can place orders for tools without the two months processing in Washington after placement. Taking these few, of the many factors into account it appears that the industry will have a sustained moderate demand for reconversion, principally for the kind of machines not found in the government owned surplus.

Informed circles are predicting that the industry will have orders on the level of about $35,000,000 a month, on the average, for the next six months. It is expected that this figure will fluctuate, but if Russia should come in with a long list within the next two or three months, it will help considerably. With this, current cancellations estimates are hovering around 15 pct of existing backlogs. Builders cannot even point to the Army and Navy priority orders with any degree of certainty, since some of these machines may easily be for new developments such as rockets or jet propulsion, and these the government would like to complete. And in the case of contractors who have been using service ratings, sometimes they want the machines anyway.

At this time, inventories do not seem to be dangerously large and certainly not out of scale with the present volume of business. But if cancellations come in and the reconversion demand takes a sudden dip downward, inventories will be another matter.

To date, Warner & Swasey have received few cancellations, but less than one pct of the backlog, which extends to four or five months, has been affected. The company has gotten hold up instructions on some subcontract work but cancellations in volume along these lines are still in the offing.

National Acme Co., according to reports, has sufficient civilian machine tool orders to keep the company busy for a year. And there is not a war order for machine tools on the order books. Other departments of the company are not causing any concern either, since there are tentative plans to carry on operations that may require the DPC building now housing the aircraft department, and company officials intimate that an offer may be made to the RFC. Should builders be brought into the surplus disposal picture there is a good possibility that this plant would prove a real help. Some months ago, National Acme received a $3,000,000 cancellation from the government for machine tools, and company officials say that this marked the start of postwar plans.

It has been reported here that RFC will need about 7,000,000 sq. ft. of floor space for storing the tools no longer required for war. These tools, largely special equipment for the manufacture of weapons, may never be needed again except in the event of another national emergency. Further atomic bomb development, however, will ultimately usher them to the scrap heap.

•

Tool Sale at Colt Set for Next Month On War Surpluses

Washington

• • • RFC has announced that its Boston agency starting Sept. 14, would hold a sale of used surplus government-owned machine tools and plant equipment at the Park Street plant of the Colt Patent Firearms Co., Hartford, Conn. No longer needed for war production, 175 items consisting of standard general and special purpose machine tools and miscellaneous factory equipment have just been released by the Army. RFC has re-appraised and priced this material. For example, a Norton 6 in. by 30 in. Type C plain grinder will be offered for $2,168.05. A Type 5-RH Hammond double end polishing and buffing lathe will go for $217.86.

•

All Dealers Included

New York

• • • Plans of the Reconstruction Finance Corp. for the disposal of machine tools, now being considered, include the possible use of the facilities of all interested machinery dealers.

A recent issue of THE IRON AGE erroneously gave the impression that such consideration was being given only to the use of the facilities of member companies of the Machinery Dealers' National Association.

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NON-FERROUS METALS

. . . News and Market Activities

Lead Control Order Relaxation Studied

New York

• • • Lead continues to be controlled by order M-38 and while members of the industry favor a relaxation of the drastic restrictions on certain classes of products, apparently officials do not feel that modification can be permitted without a serious disturbance of the supply-demand position.

The industry points out that consumption of tetra-ethyl lead for bomber fleet gas should drop markedly soon. Consumption of lead by this product has been at the rate of 100,000 tons per year, about 10 pct of total lead consumption.

It is expected that England may not want to continue to import lead from Australia and Canada. Therefore, these supplies could be used to supplement Mexican imports and domestic production. The trade considers that such imports could be arranged for by private enterprise were governmental controls to be relaxed.

On the other hand members of the industry are willing to concede that it is difficult to predict exactly what would happen to the delicate balance of lead supply and demand if all government control were lifted.

The stockpile is reported to continue at about 100,000 tons.

•

Nickel Is Open-Ended

New York

• • • Nickel has been open-ended by WPB by transferring restrictions on nickel, nickel chemicals, alloys and catalysts contained in M-6-a and Direction 1 to M-21 Direction 8. However, suppliers must continue to deliver on rated orders in accordance with PR-1. WPB authorization must be obtained on Form WPB 1770 in order to melt nickel for rated or unrated orders.

Monel, rolled nickel and Inconel may be sold by warehouses on rated orders without limitation, on unrated orders only if replacement is scheduled within 120 days. Sale and delivery of these three metals by rerollers may be made on rated orders without limitation but on unrated orders only after delivery against rated orders for the month and if scheduled for replacement within 60 days.

•

Copper Scrap Prices Decline 2c per Lb

New York

• • • Copper, brass and bronze scrap, moderately weak over the past month, since V-J Day has dropped several cents in price although this might be considered a nominal quotation inasmuch as there are no factors in the market who would be likely to dispose of holdings acquired at the much higher cost represented by ceilings. However, some ingot producers would be inclined to purchase copper scrap offerings made as much as 2c. below ceiling prices, for there is the expectancy that the present condition is only a temporary one which will in time rectify itself. This is the first indication of a real price drop in the copper, brass and bronze market, except brass mill scrap, since the beginning of the war.

•

Copper Demand Is Heavy

New York

• • • Copper producers report that civilian copper orders for September delivery are expected to approach recent levels and perhaps even exceed the low shipments reported for the last few months. A large share of current copper consumption is made up of cake for brass pipe and tubing. Plumbing supply houses all over the country are said to be stocking up on pipe now that it is available for civilian use. Already, the commonest size for building construction, ½ in., is widely available and is said to be selling at prewar prices.

Lake copper, containing a small silver content which is said to improve its annealing qualities for soldering and other joining techniques, is apparently in very heavy demand for auto radiator tubing among other products.

Aluminum Scrap Market Demoralized Since V-J

New York

• • • Ingot producers, since V-J Day and the contract cancellations which have been particularly hard on aluminum suppliers, are refusing to purchase aluminum scrap at any price since then, and therefore prices quoted are purely nominal. It is apparently impossible to obtain responsible price quotations for aluminum scrap. In fact, ingot producers would be glad to dispose of some scrap holdings if a buyer were in the market at this time.

Aluminum scrap continued relatively firm until V-J Day at below-ceiling prices, at which time it received a severe setback as a result of military cancellations. Since that time there has been no one willing to set a market price for fear of receiving scrap offerings.

•

Chromium Iridium Released from Control

New York

• • • The War Production Board has announced that limitation orders have been revoked covering iridium, M-49, and chromium, M-18-a. The latter order covering chromium has now been superseded by Order M-21, Direction 7.

•

Mercury Price Drops

New York

• • • Under the impetus of contract cutbacks the price of mercury at New York has dropped to a range of $126 to $129 per flask, a drastic decline in view of the recent stabilized market about $20 higher. It is reported that certain marginal producers are considering a withdrawal from production at least temporarily in order to give consideration to future market possibilities. This price reduction is attributable very largely to the importation of Spanish mercury which began some months ago.

Primary Metals

(Cents per lb., unless otherwise noted)

Aluminum, 99+%, del'd (Min. 10,000 lb.)	15.00
Antimony, American, Laredo, Tex.	14.50
Beryllium copper, 3.75-4.25% Be; dollars per lb. contained Be	$17.00
Cadmium, del'd	90.00
Cobalt, 97-99% (per lb.)	$1.50 to $1.57
Copper, electro, Conn. valley	12.00
Copper, electro, New York	11.75
Copper, lake	12.00
Gold, U. S. Treas., dollars per oz.	$35.00
Indium, 99.8%, dollars per troy oz.	$3.00
Iridium, dollars per troy oz.	$120.00
Lead, St. Louis	6.35
Lead, New York	6.50
Magnesium, 99.9 + %, carlots	20.50
Magnesium, 12-in. sticks, carlots	27.50
Mercury, dollars per 76-lb. flask, f.o.b. New York	$126.00 to $129.00
Nickel, electro	35.00
Palladium, dollars per troy oz.	$24.00
Platinum, dollars per oz.	$85.00
Silver, open market, New York, cents per oz.	44.75
Tin, Straits, New York	52.00
Zinc, East St. Louis	8.35
Zinc, New York	8.65

Remelted Metals

(Cents per lb. unless otherwise noted)

Aluminum, No. 12 Fdy. (No. 2)	9.00 to 10.00
Aluminum, deoxidizing No. 2, 3, 4	$6.00 to 9.50
Brass Ingot	
85-5-5-5 (No. 115)	13.25
88-10-2 (No. 215)	16.75
80-10-10 (No. 305)	16.00
No. 1 Yellow (No. 405)	10.25

Copper, Copper Base Alloys

(Mill base, cents per lb.)

	Extruded Shapes	Rods	Sheets
Copper	20.37	....	20.37
Copper, H.R.	....	17.37	....
Copper drawn	....	18.37	....
Low brass, 80%	....	20.40	20.15
High brass	....	....	19.48
Red brass, 85%	....	20.61	20.36
Naval brass	20.37	19.12	24.50
Brass, free cut	....	15.01	....
Commercial bronze, 90%	....	21.32	21.07
Commercial bronze, 95%	....	21.53	21.28
Manganese bronze	24.00	....	28.00
Phos. bronze, A, B, 5%	....	26.50	26.25
Muntz metal	20.12	18.87	22.75
Everdur, Herculoy, Olympic or equal	....	25.50	26.00
Nickel silver, 5%	....	28.75	26.50
Architect bronze	19.12	....	....

Aluminum

(Cents per lb., subject to extras on gage, size, temper, finish, factor number, etc.)

Tubing: 2 in. O.D. x 0.065 in. wall 2S, 40c. (½H); 52S, 61c. (O); 24S, 67½c. (T).

Plate: 0.250 in. and heavier: 2S and 3S, 21.2c.; 52S, 24.2c.; 61S, 22.8c.; 24S, 24.2c.

Flat Sheet: 0.128 in. thickness: 2S and 3S, 22.7c. a lb.; 52S, 26.2c.; 61S, 24.7c.; 24S, 26.7c.

2000-lb. base for tubing; 30,000-lb. base for plate, flat stock.

Extruded Shapes: "As extruded" temper; 2000-lb. base, 2S and 3S, factor No. 1 to 4, 25.5c.; 14S, factor No. 1 to 4, 35c.; 17S, factor No. 1 to 4, 31c.; 24S, factor No. 1 to 4, 34c.; 53S, factor No. 1 to 4, 23c.; 61S, factor No. 1 to 4, 28½c.

The factor is determined by dividing perimeter of shape by weight per lineal foot.

Wire Rod and Bar: Base price: 17ST and 11ST-3, screw machine stock. Rounds: ¼ in., 28½c. per lb.; ½ in., 26c.; 1 in., 24½c.; 2 in., 23c. Hexagonals: ¼ in., 34½c. per lb.; ½ in., 28½c.; 1 in., 25½c.; 2 in., 25½c. 2S, as fabricated, random or standard lengths, ¼ in., 34c. per lb.; ½ in., 25c.; 1 in., 24c.; 2 in., 23c. 24ST, rectangles and squares, random or standard lengths. 0.093-0.187 in. thick by 1.001-2.000 in. wide, 33c. per lb.; 0.751-1.500 in. thick by 2.001-4.000 in. wide, 29c.; 1.501-2.000 in. thick by 4.001-6.000 in. wide, 27½c.

Magnesium

Sheet, rod, tubes, bars, extruded shapes subject to individual quotations. Metal turnings: 100 lb. or more, 46c. a lb.; 25 to 90 lb., 56c.; less than 25 lb., 66c.

NONFERROUS SCRAP METAL QUOTATIONS

†*(OPA basic maximum prices, cents per lb., f.o.b. point of shipment, subject to quality, quantity and special preparation premiums—other prices are current quotations)*

All nonferrous metal scrap prices are nominal this week since customary buyers are out of the market.

Copper, Copper Base Alloys

OPA Group 1†

No. 1 wire, No. 1 heavy copper	9.75
No. 1 tinned copper wire, No. 1 tinned heavy copper	9.75
No. 2 wire, mixed heavy copper	8.75
Copper tuyeres	8.75
Light copper	7.75
Copper borings	9.75
No. 2 copper borings	8.75
Lead covered copper wire, cable	6.00*
Lead covered telephone, power cable	6.04
Insulated copper	5.10*

OPA Group 2†

Bell metal	15.50
High grade bronze gears	13.25
High grade bronze solids	11.50*
Low lead bronze borings	11.50*
Babbitt lined brass bushings	13.00
High lead bronze solids	10.00*
High lead bronze borings	10.00*
Red trolley wheels	10.75
Tinny (phosphor bronze) borings	10.50
Tinny (phosphor bronze) solids	10.50
Copper-nickel solids and borings	9.25
Bronze paper mill wire cloth	9.50
Aluminum bronze solids	9.00
Soft red brass (No. 1 composition)	9.00
Soft red brass borings (No. 1)	9.00
Gilding metal turnings	8.50
Contaminated gilded metal solids	8.00
Unlined standard red car boxes	8.25
Lined standard red car boxes	7.75
Cocks and faucets	7.75
Mixed brass screens	7.75
Red brass breakage	7.50
Old nickel silver solids, borings	6.25
Copper lead solids, borings	6.25
Yellow brass castings	6.25
Automobile radiators	7.00
Zincy bronze borings	8.00
Zincy bronze solids	8.00

OPA Group 3†

Fired rifle shells	8.25
Brass pipe	7.50
Old rolled brass	7.00
Admiralty condenser tubes	7.50
Muntz metal condenser tubes	7.00
Plated brass sheet, pipe reflectors	6.50
Manganese bronze solids	7.25[1]
Manganese bronze solids	6.25[2]
Manganese bronze borings	6.50[1]

OPA Group 4†

Refinery brass	4.75*

*Price varies with analysis. [1] Lead content 0.00 to 0.40 per cent. [2] Lead content 0.41 to 1.00 per cent.

Other Copper Alloys

Briquetted Cartridge Brass Turnings	8.625
Cartridge Brass Turnings, Loose	7.875
Loose Yellow Brass Trimmings	7.875

Aluminum

Plant scrap, segregated

2S solids	8.00
Dural alloys, solids 14, 17, 18, 24S, 25S	4.50
turnings, dry basis	3.00
Low copper alloys 51, 52, 61, 63S solids	7.50
turnings, dry basis	5.75

Plant scrap, mixed

Solids	4.00
Turnings, dry basis	2.75

Obsolete scrap

Pure cable	8.00
Old sheet and utensils	6.00
Old castings and forgings	5.00
Pistons, free of struts	5.00
Pistons, with struts	3.00
Old alloy sheet	5.00

Magnesium*

Segregated plant scrap

Pure solids and all other solids, exempt	
Borings and turnings	1.50

Mixed, contaminated plant scrap

Grade 1 solids	3.00
Grade 1 borings and turnings	2.00
Grade 2 solids	2.00
Grade 2 borings and turnings	1.00

*Nominal.

Zinc

New zinc clippings, trimmings	6.50
Engravers, lithographers plates	6.50
Old zinc scrap	4.75
Unsweated zinc dross	5.00
Die cast slab	4.50
New die cast scrap	4.45
Radiator grilles, old and new	3.50
Old die cast scrap	3.00

Lead

Deduct 0.55c. a lb. from refined metal basing point prices or soft and hard lead including cable, for f.o.b. point of shipment price.

Nickel

Ni content 98+%, Cu under ½%, 26c. per lb.; 90 to 98% Ni, 26c. per lb contained Ni.

ELECTROPLATING ANODES AND CHEMICALS

Anodes

(Cents per lb., f.o.b. shipping point in 500 lb lots)

Copper, frt. allowed	
Cast, oval, 15 in. or longer	35½
Electrodeposited	18½
Rolled, oval, straight	19½
Curved	20½
Brass, 80-20, frt. allowed	
Cast, oval, 15 in. or longer	23½
Zinc, cast, 99.99, 15 in. or longer	16½
Nickel, 99 per cent plus, frt. allowed	
Cast	47
Rolled, depolarized	48
Silver, 999 fine	
Rolled, 1-9 troy oz., per oz.	58*

Chemicals

(Cents per lb., f.o.b. shipping point)

Copper cyanide, 1-5 bbls.	34.00
Copper sulphate, 99.5, crystals, bbls.	7.75
Nickel salts, single, 425 lb. bbls., frt. allowed	13.50
Silver cyanide, 100 oz. lots	—.4175
Sodium cyanide, 96 per cent, domestic, 100 lb. drums	15.00
Zinc cyanide, 100 lb. drums	33.00
Zinc sulphate, 39 per cent, crystals, bbls., frt. allowed	6.35

*Price based on use of foreign silver.

SCRAP

Market Holds Firm Despite Victory

New York

• • • Peace came this week and left the scrap market with practically no change whatever throughout the entire country so far as price is concerned. Apparently the industry had anticipated this development and the realization did nothing to change the sentiment of the trade that conditions were such as to permit prices to remain at ceilings at least for this week.

The factors which have been primarily responsible for this market psychology are first of all low scrap inventories at the plants of consumers, dealers and suppliers. The Bureau of Mines has reported that May scrap stocks were practically unchanged from April. There was a slight decrease to 4,902,000 gross tons at the end of the month reflecting a slight decrease in home stocks and a small increase in purchased stocks. During May, however, the consumption of purchased and home scrap stocks increased to 4,774,000 tons an increase in consumption of more than 100,000 tons in the month.

Secondary factors tending to continue a firm market include the fact that military cancellations include shell cutbacks which are big turnings producers and which should act to further limit the supply of available scrap. Also the scrap production line has more or less broken down during the war when prices hit lows during the latter half of 1944 when returns to the industry would not make it possible to continue scrap operations at currently high wage levels and in the face of difficulty of replacement of machinery and equipment.

All consumers of scrap are hesitant in discouraging scrap accumulation at this time lest they be placed in the embarrassing position of finding themselves without supplies in a civilian consumption market where there might be little or no action anticipated from government quarters to relieve a condition which would seriously impair their ability to compete in early civilian markets.

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PITTSBURGH — V-J Day introduced new thinking into the scrap business in that there is no longer the press and demand for scrap to keep mills in operation on critical war items. Now the thinking will be along lines of more conservative scrap stocks, more in line with actual needs. This tends toward more selective purchasing, closer inspection of shipments, and relatively smaller inventories. The market here is at a standstill this week. Prices have not changed simply because there have been no purchases in the past week. Mills have cancelled orders on overdue unfilled tonnages with dealers, a move that was inevitable since the mills at this point will study more closely their positions both marketwise and material-wise. Current contracts are being held in status quo. Prices are expected to remain firm for some time on all prepared grades, but there may be a drop in price on unprepared scrap. If such turns out to be the case, yard operators will have a chance to build up yard inventories which will permit a more regular flow of yard scrap and help yards regain their prewar position as a major supplier of scrap.

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CHICAGO—Wholesale cancellations of cancellable contracts by mills threw this week's market into a turmoil although shipments still were being maintained on many contracts which had not expired. One broker cancelled all dealer commitments. Complete lack of buying makes it impossible to interpret the effect on prices, and previous quotations are being maintained until new interest makes it possible to probe market levels with reasonable accuracy.

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PHILADELPHIA — The amorphous state of the scrap market here makes prediction impossible. Shipments on old contracts are continuing but no, or at least very little, new contracts are being made. As yet there has been no change in price, and it will probably take a week to 10 days before any market trend is revealed. However, it is well known that none of the mills here has a sizable inventory, and the sharp cutbacks have definitely reduced the quantity of scrap being produced, especially turnings.

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NEW YORK — Prices of all scrap grades remain at ceilings here with all factors apparently waiting to determine the results of the drastic war production cutbacks. Openhearth grades are quite firm, but there is some evidence of cancellation of contracts for turnings which have run their course. This trend is apparently localized in the metropolitan area as it is not reported in New England. There has been no reflection of this on turning prices, however, and some dealers point out that shell cutbacks may reduce turnings supply to the point where price weakness will not result from lowered steel operations.

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BOSTON—Foundries with scrap buying orders outstanding are drawing down on these at full ceiling prices, the ending of the war notwithstanding. They have not, however, placed orders for forward deliveries so far. Brokers and yards generally are still sitting on the sidelines awaiting developments. Results of the Boston navy yard sale Aug. 23 and 24, involving approximately 2000 tons of miscellaneous scrap may give the trade a cue.

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ST. LOUIS—The ending of the war has not affected the scrap iron market in the St. Louis industrial area. No cancellations have been issued, and mills have instructed dealers to keep up shipments against orders. Cutbacks have shortened the supply of industrial scrap which will cause a greater demand for agricultural scrap of which the supply has been small so far.

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BUFFALO — Victory news served to speed up scrap shipments and brokers paid ceilings to cover outstanding commitments as some consumers cleared their books of past-due contracts. Rail shipments of openhearth grades from New England and New Jersey, bought before war orders were erased, have begun to arrive and an increase in rejections of local tenders is noted. A renewal of the Canal movement from the New York City area also is expected around the end of the month. No test of the market has been made so far and prices are unchanged at the ceiling.

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BIRMINGHAM—Despite a spirit of caution on the part of buyers some orders for material are being placed here, and there has been no holdup in shipments. For the time being, at least, prices are unchanged.

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CINCINNATI — The underlying currents of the market in this area continue to be firm, with prices holding, despite the sudden cessation of war activity. Of course, dealers indicate that it is yet too soon to determine definitely the trend of the market, but the feeling is that no great change is anticipated since industry will continue to need scrap in reconversion. Large consumers have been avoiding new commitments for the past several weeks, but inventories of both mills and foundries are not large, so activity may be anticipated to replenish stocks for reconversion use.

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CLEVELAND — With operating rates tumbling, temporarily at least, scrap prices, which have continued at ceiling, are apparently ready to crack. One major consumer is cancelling orders as fast as they mature and brokers are trying to get enough scrap to cover their orders before they are cancelled. The supply is adequate for the demand, which is definitely off in comparison to past months. At the present rate, some brokers will do well to have an order left by next week, although mill inventories are reported to be in only fair condition. The market here gives evidence of continuing at a quiet tempo for perhaps as long as the next 60 days by which time the mills will be back in and prices presumably at ceiling or somewhere near it.

Going prices as obtained in the trade by IRON AGE editors, based on representative tonnages (for ceiling prices see O. P. A. schedule No. 4). Where ceiling prices are quoted they do not include brokerage fee or adjusted transportation charges. Asterisks indicate grades selling at ceilings.

PITTSBURGH

Per gross ton delivered to consumer:

No. 1 hvy. melting	$20.00*
RR. hvy. melting	21.00*
No. 2 hvy. melting	20.00*
RR. scrap rails	21.50*
Rails 3 ft. and under	23.50*
No. 1 comp'd sheets	20.00*
Hand bdld. new shts.	20.00*
Hvy. axle turn.	19.50*
Hvy. steel forge turn.	19.50*
Mach. shop turn.	15.00*
Short shov. turn.	17.00*
Mixed bor. and turn.	15.00*
Cast iron borings	16.00*
Hvy. break cast.	16.50*
No. 1 cupola	20.00*
RR. knuck. and coup.	24.50*
RR. coil springs	24.50*
Rail leaf springs	24.50*
Rolled steel wheels	24.50*
Low phos. bil. crops	25.00*
Low phos.	22.50*
RR. malleable	22.00*

CHICAGO

Per gross ton delivered to consumer:

No. 1 hvy. melting	$18.75*
No. 2 hvy. melting	18.75*
No. 1 bundles	18.75*
No. 2 dealers' bndls.	18.75*
Bundled mach. shop turn.	18.75*
Galv. bundles	16.75*
Mach. shop turn.	13.75*
Short shovel, turn.	15.75*
Cast iron borings	14.75*
Mix. borings & turn.	13.75*
Low phos. hvy. forge	23.75*
Low phos. plates	21.25*
No. 1 RR. hvy. melt.	19.75*
Reroll rails	22.25*
Miscellaneous rails	20.25*
Rails 3 ft. and under	22.25*
Locomotive tires, cut	22.75 to 23.25
Cut bolsters & side frames	20.25 to 21.25
Angles & splice bars	22.25*
Standard stl. car axles	25.00 to 25.50
No. 3 steel wheels	23.25*
Couplers & knuckles	23.25*
Agricul. malleable	22.00*
RR. malleable	22.00*
No. 1 mach. cast	20.00*
No. 1 agricul. cast	20.00*
Hvy. breakable cast	16.50*
RR. grate bars	15.25*
Cast iron brake shoes	15.25*
Stove plate	19.00*
Clean auto cast	20.00*
Cast iron carwheels	20.00*

CINCINNATI

Per gross ton delivered to consumer:

No. 1 hvy. melting	$19.50*
No. 2 hvy. melting	19.50*
No. 1 bundles	19.50*
No. 2 bundles	19.50*
Mach. shop turn.	$10.50 to 11.00
Shoveling turn.	12.50 to 13.00
Cast iron borings	11.50 to 12.00
Mixed bor. & turn.	11.50 to 12.00
Low phos. plate	22.00*
No. 1 cupola cast	20.00*
Hvy. breakable cast	16.50*
Stove plate	19.00*
Scrap rails	21.00*

BOSTON

Dealers' buying prices per gross ton, f.o.b. cars

No. 1 hvy. melting	$15.05*
No. 2 hvy. melting	15.05*
No. 1 and 2 bundles	15.05*
Busheling	15.05*
Turnings, shovelings	12.05*
Machine shop turn.	10.05*
Mixed bor. & turn.	10.05*
Cl'n cast, chem. bor.	13.06 to 14.15*

Truck delivery to foundry

Machinery cast	21.00 to 23.51*
Breakable cast	21.37 to 21.87*
Stove plate	20.00 to 23.51*

DETROIT

Per gross ton, brokers' buying prices:

No. 1 hvy. melting	$17.32*
No. 2 hvy. melting	17.32*
No. 1 bundles	17.32*
New busheling	17.32*
Flashings	17.32*
Mach. shop turn.	12.32*
Short shov. turn.	14.32*
Cast iron borings	13.32*
Mixed bor. & turn.	12.32*
Low phos. plate	19.32*
No. 1 cupola cast	20.00*
Charging box cast	19.00*
Hvy. breakable cast	16.50*
Stove plate	19.00*
Automotive cast	20.00*

PHILADELPHIA

Per gross ton delivered to consumer:

No. 1 hvy. melting	$18.75*
No. 2 hvy. melting	18.75*
No. 2 bundles	18.75*
Mach. shop turn.	13.75*
Shoveling turn.	15.75*
Cast iron borings	13.50 to 14.00
Mixed bor. & turn.	13.75*
No. 1 cupola cast	20.00*
Hvy. breakable cast	16.50*
Cast, charging box	19.00*
Hvy. axle forge turn.	18.25*
Low phos. plate	21.25*
Low phos. punchings	21.25*
Billet crops	21.25*
RR. steel wheels	23.25*
RR. coil springs	23.25*
RR. malleable	22.00*

ST. LOUIS

Per gross ton delivered to consumer:

Heavy melting	$17.50*
Bundled sheets	17.50*
Mach. shop turn.	11.25 to 11.75
Locomotive tires, uncut	18.00
Misc. std. sec. rails	19.00*
Rerolling rails	21.00*
Steel angle bars	21.00*
Rails 3 ft. and under	21.50*
RR. springs	22.00*
Steel car axles	23.50*
Stove plate	19.00*
Grate bars	15.25*
Brake shoes	15.25*
RR. malleable	22.00*
Cast iron carwheels	20.00*
No. 1 mach'ery cast	20.00*
Breakable cast	16.50*

BIRMINGHAM

Per gross ton delivered to consumer:

No. 1 hvy. melting	$17.00*
No. 2 hvy. melting	17.00*
No. 2 bundles	17.00*
No. 1 busheling	17.00*
Long turnings	$9.50 to 10.00
Cast iron borings	10.50 to 11.00
Bar crops and plate	19.50*
Structural and plate	19.50*
No. 1 cast	20.00*
Stove plate	17.00
Steel axles	18.00*
Scrap rails	18.50
Rerolling rails	20.50*
Angles & splice bars	20.50*
Rails 3 ft. & under	21.00*
Cast iron carwheels	16.50 to 17.00

YOUNGSTOWN

Per gross ton delivered to consumer:

No. 1 hvy. melting	$20.00*
No. 2 hvy. melting	20.00*
Low phos. plate	22.50*
No. 1 busheling	20.00*
Hydraulic bundles	20.00*
Mach. shop turn.	15.00*
Short shovel. turn.	17.00*
Cast iron borings	16.00*

NEW YORK

Brokers' buying prices per gross ton, on cars:

No. 1 hvy. melting	$15.33*
No. 2 hvy. melting	15.33*
Comp. black bundles	15.33*
Comp. galv. bundles	13.33*
Mach. shop turn.	10.33*
Mixed bor. & turn.	10.33*
Shoveling turn.	12.33*
No. 1 cupola cast	20.00*
Hvy. breakable cast	16.50*
Charging box cast	19.00*
Stove plate	19.00*
Clean auto cast	20.00*
Unstrip. motor blks.	17.50*
Cl'n chem. cast bor.	14.33*

BUFFALO

Per gross ton delivered to consumer:

No. 1 hvy. melting	$19.25*
No. 1 bundles	19.25*
No. 2 bundles	19.25*
No. 2 hvy. melting	19.25*
Mach. shop turn.	14.25*
Shoveling turn.	16.25*
Cast iron borings	15.25*
Mixed bor. & turn.	14.25*
No. 1 cupola cast	20.00*
Stove plate	19.00*
Low phos. plate	21.75*
Scrap rails	20.75*
Rails 3 ft. & under	22.75*
RR. steel wheels	23.75*
Cast iron car wheels	20.00*
RR. coil & leaf spgs.	23.75*
RR. knuckles & coup.	23.75*
RR. malleable	22.00*
No. 1 busheling	19.25*

CLEVELAND

Per gross ton delivered to consumer:

No. 1 hvy. melting	$19.50*
No. 2 hvy. melting	19.50*
Compressed sheet stl.	19.50*
Drop forge flashings	19.00*
No. 2 bundles	19.50*
Mach. shop turn.	14.50*
Short shovel.	16.50*
No. 1 busheling	19.50*
Steel axle turn.	19.00*
Low phos. billet and bloom crops	24.50*
Cast iron borings	15.50*
Mixed bor. & turn.	14.50*
No. 2 busheling	17.00*
No. 1 machine cast	20.00*
Railroad cast	20.00*
Railroad grate bars	15.25*
Stove plate	19.00*
RR. hvy. melting	20.50*
Rails 3 ft. & under	23.00*
Rails 18 in. & under	24.25*
Rails for rerolling	23.00*
Railroad malleable	22.00*
Elec. furnace punch	22.00*

SAN FRANCISCO

Per gross ton delivered to consumer:

RR. hvy. melting	$16.50
No. 1 hvy. melting	16.50
No. 2 hvy. melting	15.00
No. 2 bales	$13.50 to 14.25
No. 3 bales	9.50 to 10.59
Mach. shop turn.	7.00
Elec. furn. 1 ft., und.	15.50 to 17.00
No. 1 cupola cast	19.00 to 21.00

LOS ANGELES

Per gross ton delivered to consumer:

No. 1 hvy. melting	$14.50 to $15.50
No. 2 hvy. melting	13.50 to 14.50
No. 2 bales	12.50 to 13.50
No. 3 bales	9.00 to 10.00
Mach. shop turn.	4.50
No. 1 cupola cast	19.00 to 21.00

SEATTLE

Per gross ton delivered to consumer:

RR. hvy. melting	$14.50
No. 1 hvy. melting	14.50*
No. 3 bundles	11.50
Elec. furn. 1 ft., und.	17.00
No. 1 cupola cast	20.00*

Comparison of Prices . .

Advances over past week in **Heavy Type**; declines in *Italics*. Prices are f.o.b. major basing points. The various basing points for finished and semifinished steel are listed in the detailed price tables.

Flat-Rolled Steel: (cents per pound)	Aug. 21, 1945	Aug. 14, 1945	July 17, 1945	Aug. 22, 1944
Hot-rolled sheets	2.20	2.20	2.20	2.10
Cold-rolled sheets	3.05	3.05	3.05	3.05
Galvanized sheets (24 ga.)	3.70	3.70	3.70	3.50
Hot-rolled strip	2.10	2.10	2.10	2.10
Cold-rolled strip	2.80	2.80	2.80	2.80
Plates	2.25	2.25	2.25	2.10
Plates, wrought iron	3.80	3.80	3.80	3.80
Stain's c.r. strip (No. 302)	28.00	28.00	28.00	28.00
Tin and Terneplate: (dollars per base box)				
Tinplate, standard cokes	$5.00	$5.00	$5.00	$5.00
Tinplate, electrolytic	4.50	4.50	4.50	4.50
Special coated mfg. ternes	4.30	4.30	4.30	4.30
Bars and Shapes: (cents per pound)				
Merchant bars	2.25	2.25	2.25	2.15
Cold-finished bars	2.75	2.75	2.65	2.65
Alloy bars	2.70	2.70	2.70	2.70
Structural shapes	2.10	2.10	2.10	2.10
Stainless bars (No. 302)	24.00	24.00	24.00	24.00
Wrought iron bars	4.40	4.40	4.40	4.40
Wire and Wire Products: (cents per pound)				
Bright wire	2.75	2.75	2.75	2.60
Wire nails	2.90	2.90	2.90	2.55
Rails: (dollars per gross ton)				
Heavy rails	$43.00	$43.00	$43.00	$40.00
Light rails	45.00	45.00	45.00	40.00
Semifinished Steel: (dollars per gross ton)				
Rerolling billets	$36.00	$36.00	$36.00	$34.00
Sheet bars	36.00	36.00	36.00	34.00
Slabs, rerolling	36.00	36.00	36.00	34.00
Forging billets	42.00	42.00	42.00	40.00
Alloy blooms, billets, slabs	54.00	54.00	54.00	54.00
Wire Rods and Skelp: (cents per pound)				
Wire rods	2.15	2.15	2.15	2.00
Skelp	1.90	1.90	1.90	1.90

Pig Iron: (per gross ton)	Aug. 21, 1945	Aug. 14, 1945	July 17, 1945	Aug. 22, 1944
No. 2 foundry, Phila.	$26.84	$26.84	$26.84	$25.84
No. 2, Valley furnace	25.00	25.00	25.00	24.00
No. 2 Southern, Cin'ti	26.11	26.11	26.11	25.11
No. 2, Birmingham	21.38	21.38	21.38	20.38
No. 2 foundry, Chicago†	25.00	25.00	25.00	24.00
Basic, del'd eastern Pa.	26.34	26.34	26.34	25.34
Basic, Valley furnace	24.50	24.50	24.50	23.50
Malleable, Chicago†	25.00	25.00	25.00	24.00
Malleable, Valley	25.00	25.00	25.00	24.00
L. S. charcoal, Chicago	42.34	42.34	42.34	37.34
Ferromanganese‡	135.00	135.00	135.00	135.00

† The switching charge for delivery to foundries in the Chicago district is 60¢ per ton.
‡ For carlots at seaboard.

Scrap: (per gross ton)				
Heavy melt'g steel, P'gh	$20.00	$20.00	$20.00	$20.00
Heavy melt'g steel, Phila.	18.75	18.75	18.75	18.75
Heavy melt'g steel, Ch'go	18.75	18.75	18.75	18.75
No. 1 hy. comp. sheet, Det.	17.32	17.32	17.32	17.85
Low phos. plate, Youngs'n	22.50	22.50	22.50	22.50
No. 1 cast, Pittsburgh	20.00	20.00	20.00	20.00
No. 1 cast, Philadelphia	20.00	20.00	20.00	20.00
No. 1 cast, Chicago	20.00	20.00	20.00	20.00
Coke, Connellsville: (per net ton at oven)				
Furnace coke, prompt	$7.50	$7.50	$7.50	$7.00
Foundry coke, prompt	9.00	9.00	9.00	8.25
Nonferrous Metals: (cents per pound to large buyers)				
Copper, electro., Conn.	12.00	12.00	12.00	12.00
Copper, Lake	12.00	12.00	12.00	12.00
Tin, Straits, New York	52.00	52.00	52.00	52.00
Zinc, East St. Louis	8.25	8.25	8.25	8.25
Lead, St. Louis	6.35	6.35	6.35	6.35
Aluminum, virgin, del'd	15.00	15.00	15.00	15.00
Nickel, electrolytic	35.00	35.00	35.00	35.00
Magnesium, ingot	20.50	20.50	20.50	20.50
Antimony, Laredo, Tex.	14.50	14.50	14.50	14.50

Composite Prices . .

Starting with the issue of Apr. 22, 1943, the weighted finished steel index was revised for the years 1941, 1942 and 1943. See explanation of the change on p. 90 of the Apr. 22, 1943 issue. Index revised to a quarterly basis as of Nov. 16, 1944; for details see p. 98 of that issue. The finished steel composite prices for the current quarter are an estimate based on finished steel shipments for the previous quarter. These figures will be revised when the actual data of shipments for this quarter are compiled.

	FINISHED STEEL	PIG IRON	SCRAP STEEL
Aug. 21, 1945	2.41571¢ a pound	$24.61 a gross ton	$19.17 a gross ton
One week ago	2.41571¢ a pound	$24.61 a gross ton	$19.17 a gross ton
One month ago	2.41571¢ a pound	$24.61 a gross ton	$19.17 a gross ton
One year ago	2.30837¢ a pound	$23.61 a gross ton	$19.17 a gross ton

	FINISHED STEEL HIGH	FINISHED STEEL LOW	PIG IRON HIGH	PIG IRON LOW	SCRAP STEEL HIGH	SCRAP STEEL LOW
1945	2.41571¢ May 29	2.21189¢ Jan. 2	$24.61 Feb. 20	$23.61 Jan. 2	$19.17	$19.17
1944	2.30837¢ Sept. 5	2.21189¢ Oct. 5	$23.61	$23.61	19.17	$15.67 Oct. 24
1943	2.25513¢	2.25513¢	23.61	23.61	19.17	$19.17
1942	2.26190¢	2.26190¢	23.61	23.61	19.17	$19.17
1941	2.43078¢	2.43078¢	$23.61 Mar. 20	$23.45 Jan. 2	$22.00 Jan. 7	$19.17 Apr. 10
1940	2.30467¢ Jan. 2	2.24107¢ Apr. 16	23.45 Dec. 23	22.61 Jan. 2	21.83 Dec. 30	16.04 Apr. 9
1939	2.35367¢ Jan. 3	2.26689¢ May 16	22.61 Sept. 19	20.61 Sept. 12	22.50 Oct. 3	14.08 May 16
1938	2.58414¢ Jan. 4	2.27207¢ Oct. 18	23.25 June 21	19.61 July 6	15.00 Nov. 22	11.00 June 7
1937	2.58414¢ Mar. 9	2.32263¢ Jan. 4	23.25 Mar. 9	20.25 Feb. 16	21.92 Mar. 30	12.67 June 8
1936	2.32263¢ Dec. 28	2.05200¢ Mar. 10	19.74 Nov. 24	18.73 Aug. 11	17.75 Dec. 21	12.67 June 9
1935	2.07642¢ Oct. 1	2.06492¢ Jan. 8	18.84 Nov. 5	17.83 May 14	13.42 Dec. 10	10.33 Apr. 29
1934	2.15367¢ Apr. 24	1.95757¢ Jan. 2	17.90 May 1	16.90 Jan. 27	13.00 Mar. 13	9.50 Sept. 25
1933	1.95578¢ Oct. 3	1.75836¢ May 2	16.90 Dec. 5	13.56 Jan. 3	12.25 Aug. 8	6.75 Jan. 3
1932	1.89196¢ July 5	1,83901¢ Mar. 1	14.81 Jan. 5	13.56 Dec. 6	8.50 Jan. 12	6.43 July 5
1931	1.99626¢ Jan. 13	1.86586¢ Dec. 29	15.90 Jan. 6	14.79 Dec. 15	11.33 Jan. 6	8.50 Dec. 29
1930	2.25488¢ Jan. 7	1.97319¢ Dec. 9	18.21 Jan. 7	15.90 Dec. 16	15.00 Feb. 18	11.25 Dec. 9
1929	2.31773¢ May 28	2.26498¢ Oct. 29	18.71 May 14	18.21 Dec. 17	17.58 Jan. 29	14.08 Dec. 3

Weighted index based on steel bars, shapes, plates, wire, rails, black pipe, hot and cold-rolled sheets and strip, representing 78 pct of the United States output. Index recapitulated in Aug. 28, 1941 issue.

Based on averages for basic iron at Valley furnaces and foundry iron at Chicago, Philadelphia, Buffalo, Valley and Southern iron at Cincinnati.

Based on No. 1 heavy melting steel scrap quotations to consumers at Pittsburgh, Philadelphia and Chicago.

PRESS FORGE

RING GEAR BLANKS

for high production and economy

Automotive differential ring gear blanks, as well as many other types of multi-stage forgings can be forged profitably in a single heat and at a high rate of production on Ajax Air Clutch controlled Forging Presses. The soundness of mechanical construction of Ajax Presses, embracing many exclusive, patented, mechanical features, effects a high degree of accuracy of the finished forgings. The massive solid steel frame provides a maximum of rigidity. The air clutch contributes to the greater speed and ease of operation. The exclusive rear extension guided ram with its great over-all guided length, maintains accurate alignment of dies in spite of off-center pressures of multi-stage forging. The illustration at left shows a cross section and three sizes of press forged ring gear blanks.

Write for Bulletin No. 75

THE AJAX MANUFACTURING COMPANY

EUCLID BRANCH P. O. CLEVELAND 17, OHIO

621 MARQUETTE BUILDING · CHICAGO 3, ILLINOIS

Prices of Finished Iron and Steel . . .

Steel prices shown here are f.o.b. basing points, in cents per pound unless otherwise indicated. Extras apply. Delivered prices do not reflect 3 pct tax on freight. (1) Mill run sheet, 10¢ per 100 lb under base; primes, 25¢ above base. (2) Unassorted commercial coating. (3) Widths up to 12-in. inclusive. (4) 0.25 carbon and less. (5) Applies to certain width and length limitations. (6) For merchant trade. (7) For straight length material only from producer to consumer. Discount of 25¢ per 100 lb to fabricators. (8) Also shafting. For quantities of 20,000 to 39,999 lb. (9) Carload lot in manufacturing trade. (10) Prices do not apply if rail and water is not used. (11) Boxed. (12) This base price for annealed, bright finish wires, commercial spring wire. (13) Produced to dimensional tolerances in AISI Manual Sect. 6. For price exceptions to finished and semi-finished steels turn several pages.

Basing Points	Pittsburgh	Chicago	Gary	Cleveland	Birmingham	Buffalo	Youngstown	Sparrows Point	Granite City	Middletown, Ohio	Gulf Ports, Cars	10 Pacific Ports, Cars	DELIVERED TO Detroit	New York	Philadelphia
SHEETS															
Hot-rolled	2.20¢	2.20¢	2.20¢	2.20¢	2.20¢	2.20¢	2.20¢	2.20¢	2.30¢	2.20¢		2.75¢	2.30¢	2.44¢	2.37¢
Cold-rolled [1]	3.05¢	3.05¢	3.05¢	3.05¢		3.05¢	3.05¢		3.15¢	3.05¢		3.70¢	3.15¢	3.29¢	3.27¢
Galvanized (24 gage)	3.70¢	3.70¢	3.70¢		3.70¢	3.70¢	3.70¢	3.70¢	3.80¢	3.70¢		4.25¢		3.94¢	3.87¢
Enameling (20 gage)	3.45¢	3.45¢	3.45¢	3.45¢			3.45¢		3.55¢	3.45¢		4.10¢	3.55¢	3.81¢	3.77¢
Long ternes [2]	3.80¢	3.80¢	3.80¢									4.55¢		4.16¢	4.12¢
STRIP															
Hot-rolled [3]	2.10¢	2.10¢	2.10¢	2.10¢	2.10¢		2.10¢			2.10¢		2.75¢	2.20¢	2.48¢	
Cold-rolled [4]	2.80¢	2.90¢		2.80¢			2.80¢	(Worcester—3.00¢)					2.90¢	3.16¢	
Cooperage stock	2.20¢	2.20¢			2.20¢		2.20¢							2.56¢	
Commodity cold-rolled	2.95¢	3.05¢		2.95¢			2.95¢	(Worcester—3.35¢)					3.05¢	3.31¢	
TINPLATE															
Standard cokes, base box	$5.00	$5.00	$5.00						$5.10					5.36¢	5.32¢
Electro, box 0.25 lb	$4.35	$4.35	$4.35												
Electro, box 0.50 lb	$4.50	$4.50	$4.50						$4.60						
Electro, box 0.75 lb	$4.65		$4.65						$4.75						
BLACKPLATE															
29 gage [5]	3.05¢	3.05¢	3.05¢						3.15¢			4.05¢[11]			3.37¢
TERNES, MFG.															
Special coated, base box	$4.30	$4.30	$4.30						$4.40						
BARS															
Carbon steel	2.25¢	2.25¢	2.25¢	2.25¢	2.25¢	2.25¢		(Duluth—2.35¢)			2.60¢	2.90¢	2.35¢	2.59¢	2.57¢
Rail steel [6]	2.25¢	2.25¢	2.25¢	2.25¢	2.25¢	2.25¢					2.60¢	2.90¢			
Reinforcing (billet) [7]	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢			2.50¢	2.55¢	2.25¢	2.39¢	
Reinforcing (rail) [7]	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢				2.50¢	2.55¢	2.25¢		2.47¢
Cold-finished [8]	2.75¢	2.75¢	2.75¢	2.75¢		2.75¢		(Detroit—2.80¢)			(Toledo—2.90¢)			3.09¢	3.07¢
Alloy, hot-rolled	2.70¢	2.70¢				2.70¢		(Bethlehem, Massillon, Canton—2.70¢)					2.80¢		
Alloy, cold-drawn	3.35¢	3.35¢	3.35¢	3.35¢		3.35¢							3.45¢		
PLATES								(Coatesville and Claymont—2.25¢)							
Carbon steel [13]	2.25¢	2.25¢	2.25¢	2.25¢	2.25¢		2.25¢	2.25¢			2.60¢	2.80¢	2.47¢	2.44¢	2.30¢
Floor plates	3.50¢	3.50¢									3.85¢	4.15¢		3.86¢	3.82¢
Alloy	3.50¢	3.50¢			(Coatesville—3.50¢)						3.95¢	4.15¢		3.70¢	3.69¢
SHAPES															
Structural	2.10¢	2.10¢	2.10¢		2.10¢	2.10¢		(Bethlehem—2.10¢)			2.45¢	2.75¢		2.27¢	2.215¢
SPRING STEEL, C-R															
0.26 to 0.50 carbon	2.80¢			2.80¢			(Worcester—3.00¢)								
0.51 to 0.75 carbon	4.30¢			4.30¢			(Worcester—4.50¢)								
0.76 to 1.00 carbon	6.15¢			6.15¢			(Worcester—6.35¢)								
1.01 to 1.25 carbon	8.35¢			8.35¢			(Worcester—8.55¢)								
WIRE [9]															
Bright [12]	2.75¢	2.75¢		2.75¢	2.75¢		(Worcester—2.95¢)		(Duluth—2.80¢)			3.25¢			3.07¢
Galvanized	Add proper size extra and galvanizing extra to Bright Wire base														
Spring (high carbon)	3.35¢	3.35¢		3.35¢			(Worcester—3.45¢)					3.85¢			3.67¢
PILING															
Steel sheet	2.40¢	2.40¢				2.40¢						2.95¢			2.72¢

SEMIFINISHED STEEL

Ingots, Carbon, Rerolling

Base per gross ton, f.o.b. mill.... $31.00

Ingots, Carbon, Forging

Base per gross ton, f.o.b. Birmingham, Buffalo, Chicago, Cleveland, Gary, Pittsburgh, Youngstown $36.00

Ingots, Alloy

Base per gross ton, f.o.b. Bethlehem, Buffalo, Canton, Coatesville, Chicago, Massillon, Pittsburgh $45.00

Billets, Blooms and Slabs

Pittsburgh, Chicago, Gary, Cleveland, Youngstown, Buffalo, Birmingham, Sparrows Point (rerolling only). Prices delivered Detroit are $2.00 higher; delivered E. Michigan, $3.00 higher; f.o.b. Duluth, billets only, $2.00 higher; billets f.o.b. Pacific ports are $12.00 higher. Provo, $11.20 higher. Delivered prices do not reflect 3 pct tax on freight rates.

	Per Gross Ton
Rerolling	$36.00
Forging	42.00

Alloy Billets, Blooms, Slabs

Pittsburgh, Chicago, Canton, Massillon, Buffalo or Bethlehem, per gross ton $54.00

Price delivered Detroit $2.90 higher; East Michigan, $3.00 higher.

Sheet Bars

Pittsburgh, Chicago, Cleveland, Youngstown, Buffalo, Canton, Sparrows Point.

	Per Gross Ton
Openhearth or bessemer	$36.00

PRICES

Skelp

Pittsburgh, Chicago, Youngstown, Coatesville, Pa., Sparrows Point, Md.

	Per Lb.
Grooved, universal and sheared	1.90c.

Wire Rods

(No. 5 to 9/32 in.)

	Per Lb.
Pittsburgh, Chicago, Cleveland	2.15c.
Worcester, Mass.	2.25c.
Birmingham	2.15c.
San Francisco	2.65c.
Galveston	2.40c.

9/32 in. to 47/64 in., 0.15c. a lb. higher. Quantity extras apply.

Shell Steel

	Per Gross Ton
3 in. to 12 in.	$52.00
12 in. to 18 in.	54.00
18 in. and over	56.00

Basic open hearth shell steel, f.o.b. Pittsburgh, Chicago, Buffalo, Gary, Cleveland, Youngstown and Birmingham.

Prices delivered Detroit are $2.00 higher; East Michigan, $3 higher.

Price Exceptions: Follansbee Steel Corp. permitted to sell at $13.00 per gross ton, f.o.b. Toronto, Ohio, above base price of $52.00.

Note: The above base prices apply on lots of 1000 tons of a size and section to which are to be added extras for chemical requirements, cutting, or quantity.

RAILS, TRACK SUPPLIES

(F.o.b. Mill)

Standard rails, heavier than 60 lb., No. 1 O.H., gross ton	$43.00
Angle splice bars, 100 lb.	2.70
(F.o.b. Basing Points)	*Per Gross Ton*
Light rails (from billets)	$45.00
Light rails (from rail steel)	44.00
	Base per Lb.
Cut spikes	3.35c.
Screw spikes	5.40c.
Tie plate, steel	2.30c.
Tie plates, Pacific Coast	2.45c.
Track bolts	4.75c.
Track bolts, heat treated, to railroads	5.00c.
Track bolts, jobbers discount	62-5

Basing points, light rails, Pittsburgh, Chicago, Birmingham; cut spikes and tie plates—Pittsburgh, Chicago, Portsmouth, Ohio, Weirton, W. Va., St. Louis, Kansas City, Minnequa, Colo., Birmingham and Pacific Coast ports; tie plates alone—Steelton, Pa., Buffalo. Cut spikes alone—Youngstown, Lebanon, Pa., Richmond, Oregon and Washington ports, add 25c.

TOOL STEEL

(F.o.b. Pittsburgh, Bethlehem, Syracuse)

	Base per lb.
High speed	67c.
Straight molybdenum	54c.
Tungsten-molybdenum	57½c.
High-carbon-chromium	43c.
Oil hardening	24c.
Special carbon	22c.
Extra carbon	18c.
Regular carbon	14c.

Warehouse prices east of Mississippi are 2c. a lb. higher; west of Mississippi 3c. higher.

WIRE PRODUCTS

To the trade, f.o.b. Pittsburgh, Chicago, Cleveland, Birmingham, Duluth

	Basing Points Named	*Pacific Coast Basing Points†*
	Base per Keg	
Standard wire nails	$2.90	$3.40
Coated nails	2.90	3.40
Cut nails, carloads	3.85	....
	Base per 100 Lb.	
Annealed fence wire	$3.05	$3.55
Annealed galv. fence wire	3.40	3.90
	Base Column	
Woven wire fence*	67	85
Fence posts, carloads	69	86
Single loop bale ties	66	91
Galvanized barbed wire**	72	92
Twisted barbless wire	72	....

*15½ gage and heavier. **On 80-rod spools in carload quantities.

†Prices subject to switching or transportation charges.

WAREHOUSE PRICES

Delivered metropolitan areas per 100 lb. These are zoned warehouse prices in conformance with latest zoning amendment to OPA Price Schedule 49.

Cities	SHEETS			STRIP		Plates ¼ in. and heavier	Structural Shapes	BARS		ALLOY BARS			
	Hot Rolled (10 gage)	Cold Rolled	Galvanized (24 gage)	Hot Rolled	Cold Rolled			Hot Rolled	Cold Finished	Hot Rolled, NE 8617-20	Hot Rolled, NE 9442-45 Ann.	Cold Drawn, NE 8617-20	Cold Drawn, NE 9442-45 Ann.
**Philadelphia	$3.518	$4.872[a]	$4.768[a]	$3.922	$4.772	$3.605	$3.668	$3.822	$4.172	$5.818	$6.868	$7.072	$8.172
New York	3.59	4.613[a]	5.110	3.974[a]	4.772	3.768	3.758	3.853	4.203	5.858	6.908	7.103	8.203
Boston	3.744	4.744[a]	5.224[a]	4.106	4.715	3.912	3.912	4.044	4.244	6.012	7.062	7.194	8.394
Baltimore	3.394	4.882	4.894	3.902	4.752	3.584	3.759	3.802	4.152	....	....	....	....
Norfolk	3.771	4.965	5.371	4.165	4.865	3.971	4.002	4.065	4.265	....	....	....	....
Chicago	3.25	4.20	5.231	3.60	4.65[17]	3.55	3.55	3.50	3.85	5.80	6.85	6.85	7.90
Milwaukee	3.387	4.337[3]	5.272[4]	3.737	4.787[17]	3.687	3.687	3.637	3.987	5.837	6.887	6.887	7.987
Cleveland	3.35	4.40	4.877[4]	3.60	4.45	3.40	3.588	3.35	3.85	5.806	6.856	6.85	7.75
Buffalo	3.35	4.40	4.75[4]	3.819	4.669	3.63	3.40	3.35	3.85	5.80	6.85	6.85	7.75
Detroit	3.45	4.50	5.00[4]	3.70	4.85[917]	3.609	3.661	3.45	3.90	5.93	6.98	6.958	8.059
Cincinnati	3.425	4.475[3]	4.825[5]	3.675	4.711	3.661	3.691	3.611	4.111	5.95	7.00	7.011	8.261
St. Louis	3.397	4.347[3]	5.172[4]	3.747	4.931[17]	3.697	3.697	3.647	4.131	5.981	7.031	7.031	8.131
Pittsburgh	3.35	4.40	4.75	3.60	4.45	3.40	3.40	3.35	3.85	5.80	6.85	6.85	7.90
St. Paul	3.50	4.46	5.257[4]	3.86	5.102[17]	3.81[13]	3.81[13]	3.78[13]	3.461	5.94	5.99	7.361	8.461
Omaha	3.865	5.443	5.608[4]	4.215	....	4.165	4.165	4.115	4.543	....	....	....	....
Indianapolis	3.518	4.568	4.548	3.768	4.741	3.63	3.63	3.58	4.00	5.93	6.98	6.98	8.23
Birmingham	3.45	....	4.75	3.70	....	3.55	3.55	3.50	4.53	....	....	....	....
Memphis	3.965[7]	4.66	5.265	4.215	....	4.065	4.065	4.015	4.33	....	....	....	....
New Orleans	4.058[a]	5.079	5.358	4.308	....	4.158	4.158[a]	4.108[a]	4.729	....	....	....	....
Houston	3.763	5.573	6.313[1]	4.313	....	4.25	4.25	3.75	6.473[3]	7.223	8.323	8.323	9.373
Los Angeles	5.00	7.20[3]	6.10[4]	4.95	5.813[15]	4.95	4.65	4.40	5.683	8.204	9.404	9.304	10.454
San Francisco	4.55[14]	7.30[4]	6.35[4]	4.50[14]	7.33[17]	4.65[14]	4.35[14]	4.15[14]	5.433	8.304	9.404	9.404	10.454
Seattle	4.65[12]	7.05[4]	5.95[4]	4.25[12]	....	4.75[12]	4.45[12]	4.35[12]	5.883	....	9.404	....	....
Portland	4.65[11]	6.60[4]	5.75[4]	4.75[11]	....	4.85[11]	4.45[11]	4.45[11]	5.633	8.304	9.404	8.304	9.404
Salt Lake City	4.53[017]	....	6.17[13]	5.53[17]	....	4.98[17]	4.98[17]	4.88[17]	6.00	....	....	....	....

National Emergency Steels

MILL EXTRAS

Designation	Basic Open-Hearth		Electric Furnace		Designation	Basic Open-Hearth		Electric Furnace	
	Bars and Bar-Strip	Billets, Blooms, and Slabs	Bars and Bar-Strip	Billets, Blooms, and Slabs		Bars and Bar-Strip	Billets, Blooms, and Slabs	Bars and Bar-Strip	Billets, Blooms, and Slabs
NE 8612	0.65¢	$13.00	$1.15	$23.00	NE 9427	0.75¢	$15.00	$1.25	$25.00
NE 8615	0.65	13.00	1.15	23.00	NE 9430	0.75	15.00	1.25	25.00
NE 8617	0.65	13.00	1.15	23.00	NE 9432	0.75	15.00	1.25	25.00
NE 8620	0.65	13.00	1.15	23.00	NE 9435	0.75	15.00	1.25	25.00
NE 8622	0.65	13.00	1.15	23.00	NE 9437	0.75	15.00	1.25	25.00
NE 8625	0.65	13.00	1.15	23.00	NE 9440	0.75	15.00	1.25	25.00
NE 8627	0.65	13.00	1.15	23.00	NE 9442	0.80	16.00	1.30	26.00
NE 8630	0.65	13.00	1.15	23.00	NE 9445	0.80	16.00	1.30	26.00
NE 8632	0.65	13.00	1.15	23.00	NE 9447	0.80	16.00	1.30	26.00
NE 8635	0.65	13.00	1.15	23.00	NE 9450	0.80	16.00	1.30	26.00
NE 8637	0.65	13.00	1.15	23.00					
NE 8640	0.65	13.00	1.15	23.00					
NE 8642	0.65	13.00	1.15	23.00	NE 9722	0.65	13.00	1.15	23.00
NE 8645	0.65	13.00	1.15	23.00	NE 9727	0.65	13.00	1.15	23.00
NE 8647	0.65	13.00	1.15	23.00	NE 9732	0.65	13.00	1.15	23.00
NE 8650	0.65	13.00	1.15	23.00	NE 9737	0.65	13.00	1.15	23.00
					NE 9742	0.65	13.00	1.15	23.00
					NE 9745	0.65	13.00	1.15	23.00
NE 8712	0.70	14.00	1.20	24.00	NE 9747	0.65	13.00	1.15	23.00
NE 8715	0.70	14.00	1.20	24.00	NE 9750	0.65	13.00	1.15	23.00
NE 8717	0.70	14.00	1.20	24.00	NE 9763	0.65	13.00	1.15	23.00
NE 8720	0.70	14.00	1.20	24.00	NE 9763	0.65	13.00	1.15	23.00
NE 8722	0.70	14.00	1.20	24.00					
NE 8725	0.70	14.00	1.20	24.00					
NE 8727	0.70	14.00	1.20	24.00	NE 9830	1.30	26.00	1.80	36.00
NE 8730	0.70	14.00	1.20	24.00	NE 9832	1.30	26.00	1.80	36.00
NE 8732	0.70	14.00	1.20	24.00	NE 9836	1.30	26.00	1.80	36.00
NE 8735	0.70	14.00	1.20	24.00	NE 9837	1.30	26.00	1.80	36.00
NE 8737	0.70	14.00	1.20	24.00	NE 9840	1.30	26.00	1.80	36.00
NE 8740	0.70	14.00	1.20	24.00	NE 9842	1.30	26.00	1.80	36.00
NE 8742	0.70	14.00	1.20	24.00	NE 9845	1.30	26.00	1.80	36.00
NE 8745	0.70	14.00	1.20	24.00	NE 9847	1.30	26.00	1.80	36.00
NE 8747	0.70	14.00	1.20	24.00	NE 9850	1.30	26.00	1.80	36.00
NE 8750	0.70	14.00	1.20	24.00					
					NE 9912	1.20	24.00	1.55	31.00
NE 9415	0.75	15.00	1.25	25.00	NE 9915	1.20	24.00	1.55	31.00
NE 9417	0.75	15.00	1.25	25.00	NE 9917	1.20	24.00	1.55	31.00
NE 9420	0.75	15.00	1.25	25.00	NE 9920	1.20	24.00	1.55	31.00
NE 9422	0.75	15.00	1.25	25.00	NE 9922	1.20	24.00	1.55	31.00
NE 9425	0.75	15.00	1.25	25.00	NE 9925	1.20	24.00	1.65	31.00

Note 1: The ranges shown are restricted to sizes 100 sq. in. or less or equivalent cross-sectional area 18 in. wide or under with a maximum individual piece weight of 7000 lb. irrespective of size. Note 2: For steels ordered to such ranges, below the size and weight restriction, the average of all the chemical checks must be within the limits specified subject to check analysis variations given in Table 4, Section 10, AISI Steel Products Manual. Note 3: When acid open-hearth is specified and acceptable, add to basic open-hearth alloy differential 0.25c. per lb. for bars and bar strip and $5 per gross ton for billets, blooms and slabs. Note 4: The extras shown are in addition to the base price of $2.70 for 100 lb. on finished products and $54 per gross ton on semi-finished steel, major basing points, and are in cents per pound when applicable to bars and bar-strip and in dollars per gross ton when applicable to billets, blooms and slabs. The full extra applicable over the base price is the total of all extras indicated by the specific requirements of the order. The higher extra shall be charged for any size falling between two published extras.

BASE QUANTITIES

Standard unless otherwise keyed on prices.

HOT ROLLED: Sheets, strip, plates, shapes and bars, 400 to 1999 lb.

COLD ROLLED: Sheets, 400 to 1499 lb.; strip, extras on all quantities; bars, 1500 lb. base.

NE ALLOY BARS: 1000 to 39,999 lb.

EXCEPTIONS: (1) 150 to 499 lb. (2) 150 to 1499 lb. (3) 400 to 1499 lb. (4) 450 to 1499 lb. (5) 500 to 1499 lb. (6) 0 to 199 lb. (7) 400 to 1499 lb. (8) 1000 to 1999 lb. (9) 450 to 3749 lb. (10) 400 to 3999 lb. (11) 800 to 4999 lb. (12) 300 to 10,000 lb. (13) 400 to 14,999 lb. (14) 400 lb. and over. (15) 1000 lb. and over. (16) 1500 lb. and over. (17) 2000 lb. and over. (18) 3500 lb. and over.

(a) Philadelphia: Galvanized sheet, 25 or more bundles.

Extra for size, quality, etc., apply on above quotations.

*Add 0.27¢c. for sizes not rolled in Birmingham.

**City of Philadelphia only. Applicable freight rates must be added to basing point prices to obtain delivered price to other localities in metropolitan area.

LAKE SUPERIOR ORES

(51.50% Fe, Natural Content, Delivered Lower Lake Ports)*

	Per Gross Ton
Old range, bessemer, 51.50	$4.75
Old range, non-bessemer, 51.50	4.60
Mesaba, bessemer, 51.50	4.60
Mesaba, non-bessemer, 51.50	4.45
High phosphorus, 51.50	4.35

*Adjustments are made to indicate prices based on variance of Fe content of ores as analyzed on a dry basis by independent laboratories.

FLUORSPAR

Maximum price f.o.b. consumer's plant, $30 per short ton plus either (1) rail freight from producer to consumer, or (2) rail freight from Rosiclare, Ill., to consumer, whichever is lower.

Exception

When the WPB Steel Division certifies in writing the consumer's need for one of the higher grades of metallurgical fluorspar specified in the table below the price shall be taken from the table plus items (1 and 2) from paragraph above.

Effective CaF_2 Content:	*Base price per short ton*
70% or more	$33.00
65% but less than 70%	32.00
60% but less than 65%	31.00
Less than 60%	30.00

PRICES

WELDED PIPE AND TUBING

Base discounts, f.o.b. Pittsburgh district and Lorain, Ohio, mills

(F.o.b. Pittsburgh only on wrought pipe) base price—$200.00 per net ton

	Black	Galv.
Steel (buttweld)		
⅛-in.	63½	51
¼-in.	66½	55
⅜-in. to 3-in.	68½	57½
Wrought Iron (buttweld)		
⅛-in.	24	3½
¼-in.	30	10
⅜-in. and 1¼-in.	34	16
1½-in.	38	18½
2-in.	37½	18
Steel (lapweld)		
2-in.	61	49½
2½-in. and 3-in.	64	52½
3½-in. to 6-in.	66	54½
Wrought Iron (lapweld)		
2-in.	30½	12
2½-in. to 3½-in.	31½	14½
4-in.	33½	18
4½-in. to 8-in.	32½	17
Steel (butt, extra strong, plain ends)		
⅛-in.	61½	50½
¼-in.	65½	54½
⅜-in. to 3-in.	67	57
Wrought Iron (same as above)		
⅛-in.	25	6
¼-in.	31	12
⅜-in. to 2-in.	38	19½
Steel (lap, extra strong, plain ends)		
2-in.	59	48½
2½-in. and 3-in.	62	52½
3½-in. to 6-in.	66½	56
Wrought Iron (same as above)		
2-in.	33½	15½
2½-in. to 4-in.	39	22½
4½-in. to 6-in.	37½	21

On buttweld and lapweld steel pipe jobbers are granted a discount of 5 pct. On l.c.l. shipments prices are determined by adding 25 pct and 30 pct and the carload freight rate to the base card.

F.o.b. Gary prices are two points lower discount or $4 a ton higher than Pittsburgh or Lorain on lapweld and one point lower discount, or $2 a ton higher on all buttweld.

CAST IRON WATER PIPE

	Per Net Ton
6-in. and larger, del'd Chicago	$54.80
6-in. and larger, del'd New York	52.20
6-in. and larger, Birmingham	46.00
6-in. and larger f.o.b. cars, San Francisco or Los Angeles	69.40
6-in. and larger f.o.b. cars, Seattle	71.20

Class "A" and gas pipe, $3 extra; 4-in. pipe is $3 a ton above 6-in. Prices shown are for lots of less than 200 tons. For 200 tons or over, 6-in. and larger are $45 at Birmingham and $53.80 delivered Chicago, $59.40 at San Francisco and Los Angeles, and $70.20 at Seattle. Delivered prices do not reflect 3 pct tax on freight rates.

BOILER TUBES

Seamless steel and lapweld commercial boiler tubes and locomotive tubes, Minimum wall. Net base prices per 100 ft f.o.b. Pittsburgh, in carload lots.

	Seamless Cold-Drawn	Seamless Hot-Rolled	Lapweld, Hot-Rolled
2 in. O.D. 13 B.W.G.	15.03	13.04	12.38
2½ in. O.D. 12 B.W.G.	20.21	17.54	16.58
3 in. O.D. 12 B.W.G.	22.48	19.50	18.35
3½ in. O.D. 11 B.W.G.	28.37	24.62	23.15
4 in. O.D. 10 B.W.G.	35.20	30.54	28.66

(Extras for less carload quantities)

40,000 lb or ft and over	Base
30,000 lb or ft to 39,999 lb or ft	5 pct
20,000 lb or ft to 29,999 lb or ft	10 pct
10,000 lb or ft to 19,999 lb or ft	20 pct
5,000 lb or ft to 9,999 lb or ft	30 pct
2,000 lb or ft or 4,999 lb or ft	45 pct
Under 2,000 lb or ft	65 pct

PRICES

CORROSION AND HEAT-RESISTING STEEL

(Per lb. base price, f.o.b. Pittsburgh)

Chromium-Nickel Alloys

	No. 304	No. 302
Forging billets	21.25c.	20.40c.
Bars	25.00c.	24.00c.
Plates	29.00c.	27.00c.
Structural shapes	25.00c.	24.00c.
Sheets	36.00c.	34.00c.
Hot rolled strip	23.50c.	21.50c.
Cold rolled strip	30.00c.	28.00c.
Drawn wire	25.00c.	24.00c.

Straight-Chromium Alloys

	No. 410	No. 430	No. 442	No. 446
F.Billets	15.725c.	16.15c.	19.125c.	23.375c.
Bars	18.50c.	19.00c.	22.50c.	27.50c.
Plates	21.50c.	22.00c.	25.50c.	30.50c.
Sheets	26.50c.	29.00c.	32.50c.	36.50c.
Hot strip	17.00c.	17.50c.	24.00c.	35.00c.
Cold strip	22.00c.	22.50c.	32.00c.	52.00c.

Chromium-Nickel Clad Steel (20%)

	No. 304
Plates	18.00c.*
Sheets	19.00c.

*Includes annealing and pickling.

REFRACTORIES

(F.o.b. Works)

Fire Clay Brick

	Per 1000
Super-duty brick, St. Louis	$68.55
First quality, Pa., Md., Ky., Mo., Ill.	54.45
First quality, New Jersey	59.45
Sec. quality, Pa., Md. Ky., Mo., Ill.	49.40
Sec. quality, New Jersey	54.15
No. 1 Ohio	45.75
Ground fire clay, net ton	8.05

Silica Brick

Pennsylvania and Birmingham	$54.45
Chicago District	62.45
Silica cement, net ton (Eastern)	9.55

Chrome Brick

	Per Net Ton
Standard chemically bonded, Balt., Plymouth Meeting, Chester	$54.00

Magnesite Brick

Standard, Balt. and Chester	$76.00
Chemically bonded, Baltimore	65.00

Grain Magnesite

Domestic, f.o.b. Balt. and Chester in sacks (carloads)	$43.45
Domestic, f.o.b. Chewelah, Wash. (in bulk)	22.00

EXCEPTIONS TO RPS 6

Ingots, carbon, rerolling—Phoenix Iron Co. may charge $38.75; Kaiser Co. $43.00 f.o.b. Pacific Coast ports; Empire Sheet & Tinplate Co., $34.25; Pgh. Steel Co., $33.10. Granite City Steel, $39.45.

Ingots, carbon, forging—Phoenix Iron Co. may charge $43.00; Empire Sheet & Tinplate Co., $39.25, f.o.b. Mansfield, Ohio; West Coast producers, $48.00, f.o.b. Pacific Coast Ports; Pgh. Steel Co. $38.10.

Ingots, alloy—C/l delivered Detroit add $2.00; delivered East Michigan add $3.00. Connors Steel Co. may charge $45.00 f.o.b. Birmingham.

Slabs, per gross ton—Andrews Steel Co. $41 basing pts.; Wheeling Steel Corp. (rerolling) 4 in. sq. or larger $37.75 f.o.b. Portsmouth, Ohio; Empire Sheet & Tin Plate Corp. $41; Phoenix Iron Co. (rerolling) $41, (forging) $47; Granite City Steel $47.50; Kaiser Co., (rerolling) $53.64, (forging) $64.64, f.o.b. Los Angeles.

Blooms, per gross ton—Phoenix Iron Co. (rerolling) $41; (forging) $47; Pgh. Steel Co. (rerolling) $38.25, (forging) $44.25; Wheeling Steel Corp. (rerolling) 4 in. sq. or larger $37.75 f.o.b. Portsmouth; Kaiser Co. (rerolling) $53.64, (forging) $64.64 (shell steel) $74.64 f.o.b. Los Angeles.

Sheet Bar, per gross ton—Empire Sheet & Tinplate Co. $39 mill; Wheeling Steel Corp. $38 Portsmouth, Ohio.

Billets, Forging, per gross ton—Andrews Steel Co. $50 basing pts.; Follansbee Steel Corp. $49.50 Toronto, Ohio; Phoenix Iron Co. $47 mill; Geneva Steel Co. $64.64 f.o.b. Pacific Coast; Pittsburgh Steel Co. $49.50; Kaiser Co. $64.64, (shell steel) $74.64, f.o.b. Los Angeles.

PRICES

Billets, Rerolling, per gross ton—Continental Steel Corp. may charge Acme Steel in Chicago switching area $34 plus freight from Kokomo, Ind.; Northwestern Steel & Wire Co. (Lend-Lease) $41 mill; Wheeling Steel Corp. 4 in. sq. or larger $37.75, smaller $39.50 f.o.b. Portsmouth, Ohio; Stanley Works may sell Washburn Wire Co. under allocation at $39 Bridgeport, Conn.; Keystone Steel & Wire Co. may sell Acme Steel Co. at Chicago base, f.o.b. Peoria; Phoenix Iron Co. $41 mill; Continental Steel Corp. (1⅝ x 1¾) $39.50, (2 x 2) $40.60 Kokomo, Ind. (these prices include $1 size extra); Keystone Steel & Wire Co. $36.40 Peoria; Connors Steel Co. $50.60 Birmingham; Ford Motor Co. $34 Dearborn, Mich.; Geneva Steel Co. $58.64 f.o.b. Pacific Coast; Pgh. Steel Co. $43.50; Kaiser Co. $58.64 f.o.b. Los Angeles.

Structural Shapes—Phoenix Iron Co. 2.35c. basing pts. (export) 2.50c. Phoenixville; Knoxville Iron Co. 2.30c. basing points; Kaiser Co. 3.20c. f.o.b. Los Angeles.

Rails, per gross ton—Sweet Steel Co. (rail steel) $50 mill; West Virginia Rail Co. (lightweight) on allocation based Huntington, W. Va.; Colorado Fuel & Iron, $45 Pueblo.

Hot Rolled Plate—Granite City Steel Co. 2.85c. produced on DPC eqpt., 2.35c. otherwise; Knoxville Iron Co. 2.25c. basing pts.; Kaiser Co. and Geneva Steel Co. 3.20c. Pacific Ports; Central Iron and Steel Co. 2.50c. basing points; Granite City Steel Co. 2.35c. Granite City.

Merchant Bars—W. Ames Co., 10 tons and over, 2.85c. mill; Eckels-Nye Steel Corp. 2.50c. basing pts. (rail steel) 2.40c.; Phoenix Iron Co. 2.40c. basing pts.; Sweet Steel Co. (rail steel) 2.33c. mill; Joslyn Mfg. & Supply Co., 2.35c. Chicago; Calumet Steel Div., Borg Warner Corp. (8 in. mill bar), 2.35c. Chicago; Knoxville Iron Co., 2.30c. basing pts.; Laclede Steel Co., sales to LaSalle Steel granted Chicago base, f.ob Madison, Ill.; Milton Mfg. Co., 2.75c. f.o.b. Milton, Pa.

Pipe Skelp—Wheeling Steel, Benwood, 2.05c.

Reinforcing Bars—W. Ames & Co., 10 tons and over, 2.85c. mill; Sweet Steel Co. (rail steel), 2.33c. mill; Columbia Steel Co., 2.50c. Pacific Ports.

Cold Finished Bars—Keystone Drawn Steel Co. on allocation, Pittsburgh c.f. base plus c/l freight on hot rolled bars Pittsburgh to Spring City, Pa.; New England Drawn Steel Co. on allocation outside New England, Buffalo c.f. base plus c/l freight Buffalo to Mansfield, Mass., f.o.b. Mansfield; Empire Finished Steel Corp. on allocation outside New England, Buffalo c.f. base plus c/l freight Buffalo to plants, f.o.b. plant; Compressed Steel Shafting Co. on allocation outside New England, Buffalo base plus c/l freight Buffalo to Readville, Mass., f.o.b. Readville; Medart Co. in certain areas, Chicago c.f. base plus c/l freight Chicago to St. Louis, f.o.b. St. Louis.

Alloy Bars—Texas Steel Co., for delivery except Texas and Okla., Chicago base, f.o.b. Fort Worth, Tex.; Connors Steel Co., shipped outside Ala., Mississippi, Louisiana, Georgia, Florida, Tenn., Pittsburgh base, f.o.b. Birmingham.

Hot Rolled Strip—Joslyn Mfg. & Supply Co., 2.30c. Chicago; Knoxville Iron Co., 2.25c. basing pts.

Hot Rolled Sheets—Andrews Steel Co., Middletown base on shipments to Detroit or area; Parkersburg Iron & Steel, 2.25c. Parkersburg. Granite City Steel 2.43c.

Galvanized Sheets—Andrews Steel Co. 3.75c. basing pts.; Parkersburg Iron & Steel Co., 3.85c. Parkersburg; Continental Steel Co., Middletown base on Kokomo, Ind., product; Superior Sheet Steel Co., Pittsburgh base except for Lend-Lease.

Pipe and Tubing—South Chester Tube Co. when priced at Pittsburgh, freight to Gulf Coast and Pacific Ports may be charged from Chester, Pa., also to points lying west of Harrisburg, Pa.

Black Sheets—Empire Sheet and Tinplate Co., maximum base price mill is 2.45c. per 100 lb., with differentials, transportation charges, etc., provided in RPS. No. 6.

Wire Products—Pittsburgh Steel Co., f.o.b. Pittsburgh, per 100 lb., rods, No. 5 to 9/32 in., 2.20c.; rods, heavier than 9/32, 2.35c.; bright wire, 2.725c.; bright nails, 2.90c.; lead and furnace annealed wire, 2.85c.; pot annealed wire, 2.85c.; galvanized barbed wire, 3.90c.; plain staples, 2.55c.; galvanized staples, 2.65c.; bright spring wire, 3.30c.; galvanized spring wire, 3.45c.

PIG IRON PRICES

BASING POINT* BASE PRICES

Basing Point	Basic	No. 2 Foundry	Malleable	Bessemer	Low Phos.
Bethlehem	$25.50	$26.00	$26.50	$27.00	.....
Birdsboro	25.50	26.00	26.50	27.00	$30.50
Birmingham	20.00	21.38	.....	26.00	.....
Buffalo	24.00	25.00	25.50	26.00	30.50
Chicago	24.50	25.00	25.00	25.50	.....
Cleveland	24.50	25.00	25.00	25.50	.....
Detroit	24.50	25.00	25.00	25.50	.....
Duluth	25.00	25.50	25.50	26.00	.....
Erie	24.50	25.00	25.50	26.00	.....
Everett	25.50	26.00	26.50	27.00	.....
Granite City	24.50	25.00	25.00	25.50	.....
Hamilton	24.50	25.00	25.00	.....	.....
Neville Island	24.50	25.00	25.00	25.50	.....
Provo	22.50	23.00	.....	.....	.....
Sharpsville[1]	24.50	25.00	25.00	25.50	.....
Sparrows Point	25.50	26.00	.....	.....	.....
Steelton	25.50	.....	.....	.....	30.50
Swedeland	25.50	26.00	26.50	27.00	.....
Toledo	24.50	25.00	25.00	25.50	.....
Youngstown	24.50	25.00	25.00	25.50	.....

DELIVERED PRICES† (BASE GRADES)

Consuming Point	Basing Point	Freight Rate	Basic	No. 2 Foundry	Malleable	Bessemer	Low Phos.
Boston	Everett	$ .50	$26.00	$26.50	$27.00	$27.50	.....
Boston	Birdsboro-Steelton	4.02	.....	.....	.....	.....	$34.52
Brooklyn	Bethlehem	2.50	28.00	28.50	29.00	29.50	.....
Brooklyn	Birdsboro	2.92	.....	.....	.....	.....	33.42
Canton	Cleveland	1.39	25.89	26.39	26.39	26.89	.....
Canton	Buffalo	3.19	.....	.....	.....	.....	33.69
Cincinnati	Birmingham	4.06	24.06	25.44	.....	.....	.....
Cincinnati	Hamilton	1.11	.....	.....	26.11	.....	.....
Cincinnati	Buffalo	4.40	.....	.....	.....	.....	34.90
Jersey City	Bethlehem	1.53	27.03	27.53	28.03	28.53	.....
Jersey City	Birdsboro	1.94	.....	.....	.....	.....	32.44
Los Angeles	Provo	4.95	27.45	27.95	.....	.....	.....
Los Angeles	Buffalo	15.41	.....	.....	.....	.....	45.91
Mansfield	Cleveland & Toledo	1.94	26.44	26.94	26.94	27.44	.....
Mansfield	Buffalo	3.36	.....	.....	.....	.....	33.86
Philadelphia	Swedeland	.84	28.34	28.84	27.34	27.84	.....
Philadelphia	Birdsboro	1.24	.....	.....	.....	.....	31.74
San Francisco	Provo	4.95	27.45	27.95	.....	.....	.....
San Francisco	Buffalo	15.41	.....	.....	.....	.....	45.91
Seattle	Provo	4.95	27.45	27.95	.....	.....	.....
Seattle	Buffalo	15.41	.....	.....	.....	.....	45.91
St. Louis	Granite City	.50	25.00	25.50	26.50	26.00	.....
St. Louis	Buffalo	7.07	.....	.....	.....	.....	37.57

* Maximum per gross ton, established by OPA February 14, 1945. † Prices do not reflect 3 per cent tax on freight.

(1) Struthers Iron & Steel Co., Struthers, Ohio, may charge 50c. a ton in excess of basing point prices for No. 2 foundry, basic, bessemer and malleable.

Charcoal pig iron base prices for Lyles, Tenn., and Lake Superior furnaces, $33.00 and $34.00, respectively. Newberry Brand of Lake Superior charcoal iron $39.00 per g.t., f.o.b. furnace, by order L 39 to RPS 10, April 11, 1945, retroactive to March 7, 1945. Delivered to Chicago, $42.34. High phosphorus iron sells at Lyles, Tenn., at $28.50.

Basing point prices are subject to switching charges; Silicon differentials (not to exceed 50c. a ton for each 0.25 per cent silicon content in excess of base grade which is 1.75 to 2.25 per cent); Phosphorus differentials, a reduction of 38c. per ton for phosphorus content of 0.70 per cent and over; Manganese differentials, a charge not to exceed 50c. per ton for each 0.50 per cent manganese content in excess of 1.00 per cent. Effective March 3, 1943, $2 per ton extra may be charged for 0.5 to 0.75 per cent nickel content and $1 per ton extra for each additional 0.25 per cent nickel.

Silvery iron and bessemer ferrosilicon up to and including 14.00 per cent silicon covered by RPS 10 as amended Feb. 14, 1945. Silvery iron, silicon 6.00 to 6.50 per cent, C/L per G.T., f.o.b. Jackon, Ohio—$30.50; f.o.b. Buffalo—$31.75. Add $1.00 per ton for each additional 0.50% Si. Add 50c. per ton for each 0.50% Mn over 1.00%. Add $1.00 per ton for 0.75% or more P. Bessemer ferrosilicon prices are $1.00 per ton above silvery iron prices of comparable analysis.

METAL POWDERS

Prices are based on current market prices of ingots plus a fixed figure. F.o.b. shipping point, ¢ per lb, ton lots.

Copper, electrolytic, 150 and 200 mesh	21½¢ to 23½¢
Copper, reduced, 150 and 200 mesh	20½¢ to 25½¢
Iron, commercial, 100 and 200 mesh 96 + % Fe	12½¢ to 15¢
Iron, crushed, 200 mesh and finer, 90 + % Fe carload lots	4¢
Iron, hydrogen reduced, 300 mesh and finer, 98½ + % Fe, drum lots	63¢
Iron, electrolytic, unannealed, 300 mesh and coarser, 99 + % Fe	30 to 33¢
Iron, electrolytic, annealed minus 100 mesh, 99 + % Fe	42¢
Iron carbonyl, 300 mesh and finer, 98-99.8 + % Fe	90¢
Aluminum, 100 and 200 mesh	*25¢
Antimony, 100 mesh	30¢
Cadmium, 100 mesh	$1.40
Chromium, 100 mesh and finer	$1.25
Lead, 100, 200 & 300 mesh	11½ to 15¢
Manganese	65¢
Nickel, 150 mesh	51½¢
Solder powder, 100 mesh	8½¢ plus metal
Tin, 100 mesh	58¾¢
Tungsten metal powder, 98%-99%, any quantity, per lb	$2.60
Molybdenum powder, 99%, in 200-lb kegs, f.o.b. York, Pa., per lb.	$2.60
Under 100 lb	$3.00

*Freight allowed east of Mississippi.

COKE

	Net Ton
Furnace, beehive (f.o.b. oven)	
Connellsville, Pa.	$7.50*
Foundry, beehive (f.o.b. oven)	
Fayette Co., W. Va.	8.10
Connellsville, Pa.	9.00
Foundry, By-Product	
Chicago, del'd	13.75
Chicago, f.o.b.	13.00
New England, del'd	14.65
Kearny, N. J., f.o.b.	13.05
Philadelphia, del'd	13.28
Buffalo, del'd	13.40
Portsmouth, Ohio, f.o.b.	11.50
Painesville, Ohio, f.o.b.	12.15
Erie, del'd	13.15
Cleveland, del'd	13.20
Cincinnati, del'd	13.25
St. Louis, del'd	14.25
Birmingham, del'd	10.90

* Hand drawn ovens using trucked coal permitted to charge $8.00 per ton plus transportation charges.

PRICES

BOLTS, NUTS, RIVETS, SET SCREWS

Bolts and Nuts

(F.o.b. Pittsburgh, Cleveland, Birmingham or Chicago)

Machine and Carriage Bolts:

Base discount less case lots

	Per Cent Off List
½ in. & smaller x 6 in. & shorter	65½
9/16 & ⅝ in. x 6 in. & shorter	62½
¾ to 1 in. x 6 in. & shorter	61
1⅛ in. and larger, all lengths	59
All diameters over 6 in. long	59
Lag, all sizes	62
Plow bolts	65

Nuts, Cold Punched or Hot Pressed

(Hexagon or Square)

½ in. and smaller	62
9/16 to 1 in. inclusive	59
1⅛ to 1½ in. inclusive	57
1⅝ in. and larger	56

On above bolts and nuts, excepting plow bolts, additional allowance of 10 per cent for full container quantities. There is an additional 5 per cent allowance for carload shipments.

Semi-Fin. Hexagon Nuts	**U.S.S.**	**S.A.E.**
Base discount less keg lots		
7/16 in. and smaller	..	64
½ in. and smaller	62	..
½ in. through 1 in.	..	60
9/16 in. through 1 in.	59	..
1⅛ in. through 1½ in.	57	58
1⅝ in. and larger	56	..

In full keg lots, 10 per cent additional discount.

Stove Bolts

	Consumer
Packages, nuts loose	71 and 10
In packages, with nuts attached	71
In bulk	80

On stove bolts freight allowed up to 65c. per 100 lb. based on Cleveland, Chicago, New York on lots of 200 lb. or over.

Large Rivets

(½ in. and larger)

	Base per 100 Lb.
F.o.b. Pittsburgh, Cleveland, Chicago, Birmingham	$3.75

Small Rivets

(7/16 in. and smaller)

	Per Cent Off List
F.o.b. Pittsburgh, Cleveland, Chicago, Birmingham	65 and 5

Cap and Set Screws	*Consumer Per Cent Off List*
Upset full fin, hexagon head cap screws, coarse or fine thread, up to and incl. 1 in. x 6 in.	64
Upset set screws, cup and oval points	71
Milled studs	46
Flat head cap screws, listed sizes	36
Fillister head cap, listed sizes	51

Freight allowed up to 65c. per 100 lb. based on Cleveland, Chicago or New York on lots of 200 lb. or over.

ROOFING TERNE PLATE

(F.o.b. Pittsburgh, 112 Sheets)

	20x14 in.	20x28 in.
8-lb. coating I.C.	$6.00	$12.00
15-lb. coating I.C.	7.00	14.00
20-lb. coating I.C.	7.50	15.00

ELECTRICAL SHEETS

(Base, f.o.b. Pittsburgh)

	Per Lb.
Field grade	3.30c.
Armature	3.65c.
Electrical	4.15c.
Motor	5.05c.
Dynamo	5.75c.
Transformer 72	6.25c.
Transformer 65	7.25c.
Transformer 58	7.75c.
Transformer 52	8.55c.

F.o.b. Granite City, add 10c. per 100 lb. on field grade to and including dynamo. Pacific ports add 75c. per 100 lb. on all grades.

Ferromanganese

78-82% Mn, maximum contract base price per gross ton, lump size, f.o.b. car at Baltimore, Philadelphia, New York, Birmingham, Rockdale, Rockwood, Tenn.

Carload lots (bulk)	$135.00
Carload lots (packed)	141.00
Less ton lots (packed)	148.50

$1.70 for each 1% above 82% Mn; penalty, $1.70 for each 1% below 78%.

Manganese Metal

Contract basis, lump size, per lb. of metal, f.o.b. shipping point with freight allowed. Spot sales add 2c. per lb.

96-98% Mn, .2% max. C, 1% max. Si, 2% max. Fe.

Carload, bulk	36c.
L.c.l. lots	38c.

95-97% Mn, .2% max. C, 1.5% max. Si, 2.5% max. Fe.

Carload, bulk	34c.
L.c.l. lots	35c.

Spiegeleisen

Maximum base, contract prices, per gross ton, lump, f.o.b. Palmerton, Pa.

	16-19% Mn 3% max. Si	19-21% Mn 3% max. Si
Carloads	$35.00	$36.00
Less ton	47.50	48.50

Electric Ferrosilicon

OPA maximum base price cents per lb. contained Si, lump size in carloads, f.o.b. shipping point with freight allowed.

	Eastern Zone	Central Zone	Western Zone
50% Si	6.65c.	7.10c.	7.25c.
75% Si	8.05c.	8.20c.	8.75c.
80-90% Si.	8.90c.	9.05c.	9.55c.
90-95% Si.	11.05c.	11.20c.	11.65c.

Spot sales add: 45c. per lb. for 50% Si, .3c. per lb. for 75% Si, .25c. per lb. for 80-90% and 90-95% Si.

Silvery Iron

Silvery Iron, Silicon 14.01 to 14.50 per cent, $45.50 per G. T. f.o.b. Jackson, Ohio. Add $1.00 per ton for each additional 0.50% Si up to and including 18%. Add $1.00 per ton for low impurities, not to exceed: P—0.05%, S—0.04%, C—1.00%. Covered by MPR 405.

Silicon Metal

OPA maximum base price per lb. of contained Si, lump size, f.o.b. shipping point with freight allowed to destination, for l.c.l. above 2000 lb., packed. Add .25c. for spot sales.

	Eastern Zone	Central Zone	Western Zone
96% Si, 2% Fe.	13.10c.	13.55c.	16.50c.
97% Si, 1% Fe.	13.45c.	13.90c.	16.80c.

Ferrosilicon Briquets

OPA maximum base price per lb. of briquet, bulk, f.o.b. shipping point with freight allowed to destination. Approximately 40% Si. Add .25c. for spot sales.

	Eastern Zone	Central Zone	Western Zone
Carload, bulk	3.35c.	3.50c.	3.65c.
2000 lb-carload	3.8c.	4.2c.	4.25c.

Silicomanganese

Contract basis lump size, per lb. of metal, f.o.b. shipping point with freight allowed. Add .25c. for spot sales. 65-70% Mn, 17-20% Si, 1.5% max. C.

Carload, bulk	6.05c.
2000 lb. to carload	6.70c.
Under 2000 lb.	6.90c.
Briquets, contract, basis carlots, bulk freight allowed, per lb.	5.80c.
2000 lb. to carload	6.30c.
Less ton lots	6.55c.

Ferrochrome

(65-72% Cr. 2% max. Si)

OPA maximum base contract prices per lb. of contained Cr, lump size in carload lots, f.o.b. shipping point, freight allowed to destination. Add .25c. per lb. contained Cr for spot sales.

	Eastern Zone	Central Zone	Western Zone
0.06% C	23.00c.	23.40c.	24.00c.
0.10% C	22.50c.	22.90c.	23.50c.
0.15% C	22.00c.	22.40c.	23.00c.
0.20% C	21.50c.	21.90c.	22.50c.
0.50% C	21.00c.	21.40c.	22.00c.
1.00% C	20.50c.	20.90c.	21.50c.
2.00% C	19.50c.	19.90c.	21.00c.
66-71% Cr, 4-10%	13.00c.	13.40c.	14.00c.
62-66% Cr. 5-7% C	13.50c.	13.90c.	14.50c.

High-Nitrogen Ferrochrome

Low-carbon type: 67-72% Cr, 0.75% N. Add 2c. per lb. to regular low-carbon ferrochrome price schedule. Add 2c. for each additional 0.25% N. High-carbon type: 66-71% Cr, 4-5% C, 0.75% N. Add 5c. per lb. to regular high-carbon ferrochrome price schedule.

Low-Carbon Ferromanganese

Contract prices per lb. of manganese contained, lump size, f.o.b. shipping point, freight allowed to destination, Eastern Zone. Add 0.25c. for spot sales.

	Carloads, Bulk	Carloads, Ton Lots	Less Ton
0.10% max. C, 1 or 2% max. Si	23.00c.	23.40c.	23.65c.
0.15% max. C, 1 or 2% max. Si	22.00c.	22.40c.	22.65c.
0.30% max. C, 1 or 2% max. Si	21.00c.	21.40c.	21.65c.
0.50% max. C, 1 or 2% max. Si	20.00c.	20.40c.	20.65c.
0.75% max. C, 7.00% max. Si	16.00c.	16.40c.	16.65c.

Ferrochrome Briquets

Contract prices per lb. of briquet, f.o.b. shipping point, freight allowed to destination. Approx. 60 per cent contained chromium. Add 0.25c. for spot sales.

	Eastern Zone	Central Zone	Western Zone
Carload, bulk	8.25c.	8.55c.	8.95c.
Ton lots	8.75c.	9.25c.	10.75c.
Less ton lots	9.00c.	9.50c.	11.00c.

Ferromanganese Briquets

Contract prices per lb. of briquet, f.o.b. shipping point, freight allowed to destination. Approx. 66 per cent contained manganese. Add 0.25c. for spot sales.

	Eastern Zone	Central Zone	Western Zone
Carload, bulk	6.05c.	6.30c.	6.60c.
Ton lots	6.65c.	7.55c.	8.55c.
Less ton lots	6.80c.	7.80c.	8.80c.

Calcium—Manganese—Silicon

Contract prices per lb. of alloy, lump size, f.o.b. shipping point, freight allowed to destination.

16-20% Ca, 14-18% Mn, 53-59% Si. Add 0.25c. for spot sales.

	Eastern Zone	Central Zone	Western Zone
Carloads	15.50c.	16.00c.	18.05c.
Ton lots	16.50c.	17.35c.	19.10c.
Less ton lots	17.00c.	17.35c.	19.60c.

Calcium Metal

Eastern zone contract prices per lb. of metal, f.o.b. shipping point, freight allowed to destination. Add 5c. for spot sales. Add 0.9c. for Central Zone; 0.49c. for Western Zone.

	Cast	Turnings	Distilled
Ton lots	$1.80	$2.30	$5.00
Less ton lots	2.30	2.80	5.75

Chromium—Copper

Contract price per lb. of alloy, f.o.b. Niagara Falls, freight allowed east of the Mississippi River. 8-11% Cr, 88-90% Cu, 1.00% max. Fe, 0.50% max. Si. Add 2c. for spot sales.

Shot or ingot	45c.

Ferroboron

Contract prices per lb. of alloy, f.o.b. shipping point, freight allowed to destination. Add 5c. for spot sales. 17.50% min. B. 1.50% max. Si, 0.50% max. Al, 0.50% max. C.

	Eastern Zone	Central Zone	Western Zone
Ton lots	$1.20	$1.2075	$1.289
Less ton lots	1.30	1.3075	1.329

Manganese—Boron

Contract prices per lb. of alloy, f.o.b. shipping point, freight charges allowed. Add 5c. for spot sales.

75.00% Mn, 15-20% B, 5% max. Fe, 1.50% max. Si, 3.00% max. C.

	Eastern Zone	Central Zone	Western Zone
Ton lots	$1.89	$1.903	$1.935
Less ton lots	2.01	2.023	2.055

Nickel—Boron

Spot and contract prices per lb. of alloy, f.o.b. shipping point, freight allowed to destination.

15-18% B, 1.00% max. Al, 1.50% max. Si, 0.50% max. C, 3.00% max. Fe, balance Ni.

	Eastern Zone	Central Zone	Western Zone
11,200 lb. or more	$1.90	$1.9125	$1.9445
Ton lots	2.00	2.09125	2.0445
Less ton lots	2.10	2.1125	2.1445

Other Ferroalloys

Ferrotungsten, Standard grade lump or ¼X down, packed, f.o.b. plant at Niagara Falls, New York, Washington, Pa. York, Pa., per lb. contained tungsten, 10,000 lb. or more	$1.90
Ferrovanadium, 35-55%, contract basis, f.o.b. producer's plant, usual freight allowances, per lb. contained Va.	
Open hearth	$2.70
Crucible	$2.80
Primos	$2.90
Cobalt, 97% min., keg packed, contract basis, f.o.b. producer's plant, usual freight allowances, per lb. of cobalt metal	$1.50
Vanadium pentoxide, 88-92% V_2O_5 technical grade, contract basis, any quantity, per lb. contained V_2O_5. Spot sales add 5c. per lb. contained V_2O_5	$1.10
Silcaz No. 3, contract basis, f.o.b. producer's plant with usual freight allowances, per lb. of alloy. (Pending OPA approval)	
Carload lots	25c.
2000 lb. to carload	26c.
Silvaz No. 3, contract basis, f.o.b. producer's plant with freight allowances, per lb. of alloy (Pending OPA approval)	
Carload lots	58c.
2000 lb. to carload	59c.
Grainal, f.o.b. Bridgeville, Pa., freight allowed 50 lb. and over, max. based on rate to St. Louis	
No. 1	87.5c.
No. 6	60c.
No. 79	45c.
Bortram, f.o.b. Niagara Falls	
Ton lots, per lb.	45c.
Less ton lots, per lb.	50c.
Ferrocolumbium, 50-60%, contract basis, f.o.b. plant with freight allowances, per lb. contained Cb.	
2000 lb. lots	$2.25
Under 2000 lb. lots	$2.30
Ferrotitanium, 40-45%, 0.10% C. max. f.o.b. Niagara Falls, N. Y., ton lots, per lb. contained Ti	$1.23
Less ton lots	$1.25
Ferrotitanium, 20-25%, 0.10% C. max., ton lots, per lb. contained titanium	$1.35
Less ton lots	$1.40
High-carbon ferrotitanium, 15%-20%, 6-8% carbon, contract basis, f.o.b. Niagara Falls, N. Y. freight allowed East of Mississippi River, north of Baltimore and St. Louis, per carload	$142.50
Ferrophosphorus, 18% electric or blast furnaces, f.o.b. Anniston, Ala., carlots, with $3 unitage freight equalled with Rockdale, Tenn., per gross ton	58.50
Ferrophosphorus, electrolytic 23-26%, carlots, f.o.b. Monsanto (Sigio), Tenn., $3 unitage freight equalized with Nashville, per gross ton	$75.00
Ferromolybdenum, 55-75%, f.o.b. Langeloth, Washington, Pa., any quantity, per lb. contained Mo.	95c.
Calcium molybdate, 40-45%, f.o.b. Langeloth and Washington, Pa., any quantity, per lb. contained Mo.	80c.
Molybdenum oxide briquets, 48-52% Mo. f.ob. Langeloth, Pa. per lb. contained Mo	80c.
Molybdenum oxide, in cans, f.o.b Langeloth and Washington, Pa. per lb. contained Mo	80c.
Zirconium, 35-40%, contract basis, f.o.b. producer's plant with freight allowances, per lb. of alloy. Add ¼c. for spot sales	
Carload lots	14c.
Zirconium, 12-15%, contract basis, lump f.o.b. plant usual freight allowances, per lb. of alloy	
Carload, bulk	4.6c.
Alsifer (approx. 20% Al, 40% Si and 40% Fe), contract basis, f.o.b. Niagara Falls, carload, bulk	5.75c.
Ton lots	7.25c.
Simanal (approx. 20% Si, 20% Mn, 20% Al), contract basis, f.o.b. Philo, Ohio, with freight not to exceed St. Louis rate allowed, per lb.	
Car lots	8.00c.
Ton lots	8.75c.
Less ton lots	9.25c.